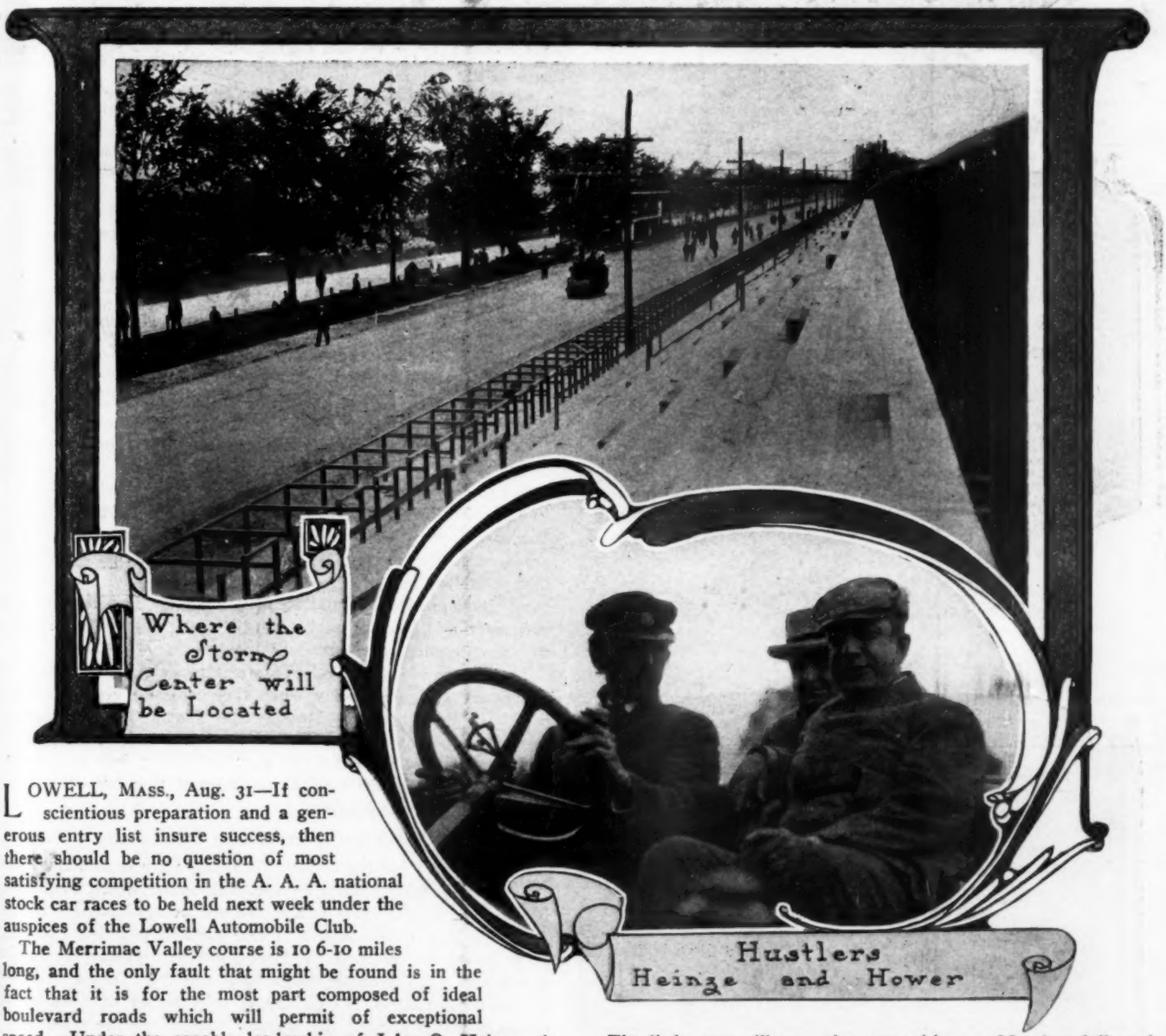
VOL. XXI NEW YORK—THURSDAY, SEPTEMBER 2, 1909—CHICAGO No. 10

THE AUTOMOBILE

# NEXT LOWELL'S NATIONAL STOCK RACES

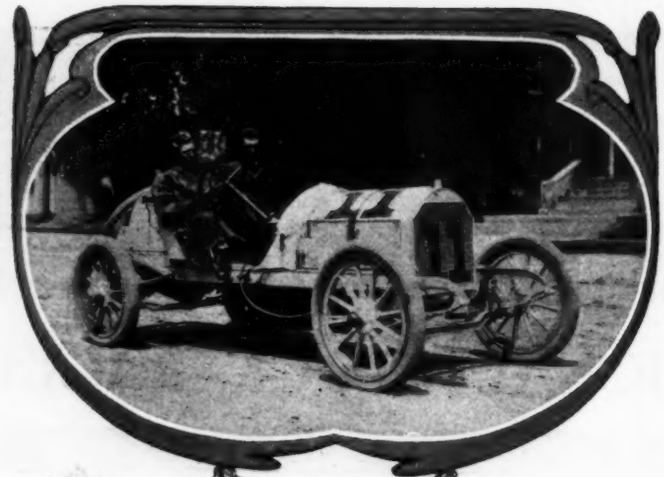



LOWELL, MASS., Aug. 31—If conscientious preparation and a generous entry list insure success, then there should be no question of most satisfying competition in the A. A. A. national stock car races to be held next week under the auspices of the Lowell Automobile Club.

The Merrimac Valley course is 10 6-10 miles long, and the only fault that might be found is in the fact that it is for the most part composed of ideal boulevard roads which will permit of exceptional speed. Under the capable leadership of John O. Heinze, the Lowell club has prepared for the racing in no prodigal manner, but with a thoroughness that has not taken into account the question of expense. Chairman F. B. Hower of the A. A. A. contest board has been very much on the scene, while the near presence in Boston of President L. R. Speare of the A. A. A. has been another advantageous situation. The representative entry is sufficient to guarantee gilt-edge sport, and the presence of enormous crowds is a certainty with a course in such close proximity to an over-populous area.

The little cars will open the competition on Monday, followed by mixed straightaway trials on Tuesday, with Wednesday devoted to the big car event. Motor boat races will occupy Thursday morning, with a Marathon foot race in the afternoon, and on Friday the meet will conclude with the motorcycle events.

That there will be speed in plenty is generally recognized, for the stock car of to-day is the equal, in available power, of the racing craft of earlier and more unrestricted days. The intent of the manufacturers interested in racing is to limit competition to cars of which the duplicates can be found in the salesroom



Moon,
Yorick Cup—
Davis, Driver.

Benz
Vesper Trophy—
Stoecker, Driver

Alco
Lowell Cup—
Grant, Driver

by the man who selects because of ability demonstrated in racing. While it is true that the rules at present require some revision, the progress made in this direction in the past year has been decidedly substantial.

### How the Various Competitions are Scheduled

From the looks of the entry list and the events scheduled, this will probably be the greatest automobile road-racing event of the year. The classes represent the fastest American and foreign cars of the "stock chassis" types. Only classes 1 and 2 will have foreign cars. Of the eighteen machines in class 1, only three are not native, the foreign representatives being the Isotta and two Fiats. In class 2 are the Benz and the Renault, the former being rather a "dark horse," as that size of Benz is scarcely known in this country.

The list of events and the days of their running are as follows:

**MONDAY, SEPTEMBER 6**

**Class 2—Vesper Club Trophy**—For all cars having a piston displacement between 301 and 450 cubic inches. The minimum weight limit for this class is 2,100 pounds. The distance will be twenty laps or 212 miles.

**Class 3—Yorick Club Trophy**—For all cars having a piston displacement between 231 and 300 cubic inches. The minimum weight limit for this class is 1,800 pounds. The distance will be fifteen laps or 159 miles.

**Class 4—Merrimac Valley Trophy**—For all cars having a piston displacement between 161 to 230 cubic inches. The minimum weight limit for this class is 1,500 pounds. The distance will be twelve laps or 127 2-10 miles.

**TUESDAY, SEPTEMBER 7**

**Mile Straightaway Trials** for high-power machines.

**WEDNESDAY, SEPTEMBER 8**

**National Stock Chassis Competition** for cars in Class 1—Lowell Trophy and $2,000 cash—The cars in this class are limited by a cylinder capacity varying from 451 to 600 cubic inches. The minimum weight limit for this class is 2,400 pounds. The distance will be thirty laps or 318 miles.

**THURSDAY, SEPTEMBER 9**

**Motor Boat Races** in the morning, and a Marathon foot race in the afternoon.

**FRIDAY, SEPTEMBER 10**

**Motorcycle** racing with six events will be run off.

Without doubt, the third day's racing will prove the representative road competition event of the season. The foremost cars and drivers are involved, among the drivers being such well-known ones as Robertson, Strang, Lytle, De Palma, Chevrolet, Burman, Cobe, Poole and Parker in the big car class. In the small cars will be Dingley, Matson, Lorimer, Jelnaw and Knipper, all of whom will drive Chalmers "Blue Birds"; while Chevrolet, Burman, DeWitt and Ryall will handle Buicks; with See, Sickinger and one yet to be named, as a Maxwell trio. Basle will have a small Renault.

The events are scheduled to start at 10 o'clock in the morning every day except Tuesday when they will not begin until 2.30 p. m. In the long races Monday and Wednesday, the cars will start at half-minute intervals, and on the opening day the smallest class will be started first; that is, class 2 will start before class 3, with class 4 last. It is expected that the classes will finish about the same time.

### Numbers Were Drawn on Monday

The numbers for the order of starting were drawn this noon, the drawing taking place in the clubrooms, which are in the Richardson Hotel. This is also the official headquarters for the A. A. A. and of the meet. Those present included Chairman F. B. Hower of the A. A. A. contest board; Secretary E. L. Ferguson and Fred Wagner, the official starter. To the secretary of the local club, J. A. McKenna, fell the lot of drawing the numbers which decided the starting position of the cars.

Special numbering will serve to distinguish each class. To class 1 belong all cars numbered from 1 to 20. Class 2, since it contains more than ten cars, has necessitated the use of letters; hence the cars are designated by letters from A-2 to K-2. All class 3 cars will have numbers in the 30's, while those which belong to class 4 will be identified by being in the 40's. Thus the class and the car can be quickly and conveniently determined at its approach. One unusual feature of this race which should be mentioned, is that it will be run clockwise instead of counter-

clockwise, as usual. Following is the official entry list, together with the order of starting:

### SMALL CAR RACE—THREE CLASSES

**Monday, Sept. 6**

CLASS 2—VESPER CLUB TROPHY: For cars of 301 and including 450 cubic inches piston displacement; minimum weight of car, 2,100 pounds; distance, 20 laps (212 miles); entry-fee for each car, $300; additional prizes: $600 to winner, $200 to second, $100 to third, in cash or plate.

| No. | Car Name | Driver |
|---|---|---|
| A-2 | Chalmers-Detroit | L. B. Lorimer |
| B-2 | Stoddard-Dayton | Burt Miller |
| C-2 | Knox | |
| D-2 | Acme | |
| E-2 | Benz | |
| F-2 | Renault | Charles Basle |
| G-2 | Buick | Louis Chevrolet |
| H-2 | Chalmers-Detroit | Burt Dingley |
| I-2 | Stoddard-Dayton | B. W. Shaw |
| J-2 | Buick | Bobby Burman |
| K-2 | Knox | Fred Belcher |

CLASS 3—YORICK CLUB TROPHY: For cars of 231 and including 300 cubic inches piston displacement; minimum weight of car, 1,800 pounds; distance, 15 laps (159 miles); entry-fee for each car, $300; additional prizes: $600 to winner, $200 to second, $100 to third, in cash or plate.

| | | |
|---|---|---|
| 30 | Columbia | John J. Coffey |
| 31 | Buick | George De Witt |
| 32 | Atlas | |
| 33 | Buick | Lewis Strang |
| 34 | Moon | Geo. Davis |

CLASS 4—MERRIMAC VALLEY TROPHY: For cars of 161 and including 230 cubic inches piston displacement; minimum weight of car, 1,500 pounds; distance, 12 laps (127 2-10 miles); entry-fee for each car, $300; additional prizes: $600 to winner, $200 to second, $100 to third, in cash or plate.

| | | |
|---|---|---|
| 40 | Buick | Arthur Chevrolet |
| 41 | Maxwell | Wm. Sickinger |
| 42 | Chalmers-Detroit | Wm. Knipper |
| 43 | Buick | Jimmie Ryall |
| 44 | Maxwell | Arthur See |
| 45 | Maxwell | |
| 46 | Chalmers-Detroit | J. M. Matson |
| 47 | Chalmers-Detroit | Frank Jelnaw |
| 48 | Velie | |

### NATIONAL STOCK CHASSIS RACE FOR THE LOWELL TROPHY

**Wednesday, Sept. 8—Distance, 318 Miles**

Open to any "stock chassis" of 451 to and including 600 cubic inches piston displacement; minimum weight of car, 2,400 pounds; entry-fee for each car, $400. The length of the course shall be 10 6-10 miles, which shall be covered thirty times, making the total distance of the race 318 miles. In addition to the trophy, cash prizes will be awarded as follows: To winner of first place, $1,000; to winner of second place, $500; to winner of third place, $300; to winner of fourth place, $200.

CLASS 1

| No. | Car Name | Driver |
|---|---|---|
| 1 | Buick | Lewis Strang |
| 2 | American | |
| 3 | Allen-Kingston | Hugh Hughes |
| 4 | Buick | Bobby Burman |
| 5 | Alco | Harry F. Grant |
| 6 | Isotta-Fraschini | A. J. Poole |
| 7 | Fiat | E. H. Parker |
| 8 | Knox | Fred Belcher |
| 9 | Stoddard-Dayton | Burt Miller |
| 10 | Knox | |
| 11 | Fiat | Ralph De Palma |
| 12 | Simplex | George Robertson |
| 14 | Knox | |
| 15 | Stoddard-Dayton | B. W. Shaw |
| 16 | Apperson Jack Rabbit | H. H. Lytle |
| 17 | Buick | Louis Chevrolet |
| 18 | Lozier | Harry H. Cobe |
| 19 | Stoddard-Dayton | |

### Great Preparations for the Race

Much credit is due to the Lowell Automobile Club for the efficient preparations which they have made so far or have under way at present. The grandstand is practically finished, and is an enormous affair. The road for more than a mile on either side of the stand is fenced with heavy wire, and both turns at Dunbar avenue are guarded in such manner that the cars can go fully fifty feet off the road before reaching the barricade.

On the day of the race it is hoped that the militia will be permitted to wear their uniforms. Five hundred soldiers and a hundred flagmen will keep the 10-6/10 mile-circuit clear.

The southern side of the course is State boulevard and is a fine macadam road. This has been treated with an asphaltum composition which is in good condition for practice and should be excellent by the time of the final races. On the northern side is a short stretch of macadam; otherwise it is ordinary dirt road. The improved road will soon be tarred, and the dirt section has already received a coat of calcium chloride, which effectually lays the dust. The steam rollers are now going over it finally to put it in the best possible condition. Not only has the club gone to the expense of treating the roads with dust-laying solutions, but

Pontoon Bridge Across the Merrimac River

they have gone so far as to cut down the top of one hill so that the descent will not be so abrupt. The hill is called the "Dip," and it is probably the worst place on the course. There is a very steep declivity, followed by a turn at the bottom. The road has been filled in until the part in the valley is fifteen or twenty feet above the creek which flows in the bottom. Along the edges of this narrow filled-in road are large heavy boulders, which will easily put any car out of the race that may skid into them, even if it does not go off of the road.

The grand stand is one of the best that has been erected at any American race. It is built in eleven sections, each of which is ninety feet long and contains seventeen boxes and seats for five hundred persons. Thus there will be accommodations for nearly 6,000 people. The entrances are from a covered walk which is under the grand stand and are of the type similar to those in the Harvard Stadium. An electric-lighted pontoon bridge has been built across the Merrimac river near the stand, so that spectators may reach the course from the trolley cars. To remove any possibility of accident to the officials and press men, a suspension bridge has been erected across the course between the judges' stand and the main stand.

Several other bridges have been put across the course at other places for the convenience of pedestrians, while across Dunbar avenue a heavy bridge has been built so that cars can reach the inside of the course without having to cross the track.

At the hairpin turn, which is at the western end of the course, the road has been widened, and a tree which grew at the center of the junction of the two roads has been removed. The only other turns of account are those from Varnum into Dunbar avenue, and from Dunbar into the boulevard. These are both rectangular, and they are to be cemented, so that the skidding will not tear them up excessively and so that there will be a wider road into which they may skid.

### Some of the Cars at Practice

Only a few of the teams had reached the circuit on Tuesday. Those which have arrived have found nearby quarters. The Chalmers team have two farmhouses on the backstretch. This team was one of the first on the course, and both Dingley and Lorimer have made a few practice runs over the course. Matson would have done so this morning had he not had the accident. Knipper and Jelnaw, his teammate, had to go around in touring cars, as their cars have been delayed on the road somewhere. The early arrival at the course of the Chalmers team is deemed significant by those who know,and a duplication of victories at Crown Point and in the Jericho Sweepstakes are predicted.

"Herb" Lytle, who is driving the Apperson, is much feared in his class, and has arrived early in order to profit by practice, if that can help to win a race.

Another contender who has been trying the circuit is Hugh Grant with the Alco. This car is practically a duplicate of the car which did so well last year over this course. Grant has the greatest confidence that he will do still better this year.

Among to-day's arrivals was Al Poole, with the Isotta and exactly similar to the car which last year won the Lowell trophy and also won the Savannah and Briarcliff cups. Last year Strang drove the car, but this year he will drive a Buick. All the Buicks have not arrived as yet. Only one has been on the course thus far.

In the second class there is considerable apprehension over the Benz entry, which is really a "dark horse," as no Benz cars of this size have been raced in this country. If the small car does as its bigger brothers have done in Europe, and in the Savannah race last year, there is little hope for the other contenders.

Where the New Dirt Road Was Made Connecting Burman Avenue and the Boulevard

Mrs. Bert Dingley, Mrs. Joe Matson, Mrs. Harry Bill

On the Track at the Grand Stand, Where a Bridge Permits Safe Passage Over the Course

The driver, Stoecker, is scarcely known in this country, but has a series of victories in Europe to his credit.

The Maxwells and the Stoddard-Dayton driven by Bert Shaw are the only others who are on the course so far to-day. The next couple of days should see the remainder of the teams on the course.

Maxwells will be represented in the light-car contest by three of the latest production, the Model Q. This is the four-cylinder car of 22-horsepower, just announced for delivery. The cars have been in a number of events, notably hill climbs, and have given splendid accounts of themselves.

Following its custom at big races, the Maxwell-Briscoe Company has arranged for the use of 20 acres of land belonging to the Butterfield farm, and this space will be thrown open to Maxwell owners. There will be ample parking space thus assured for all who tour to the carnival in this make of automobile.

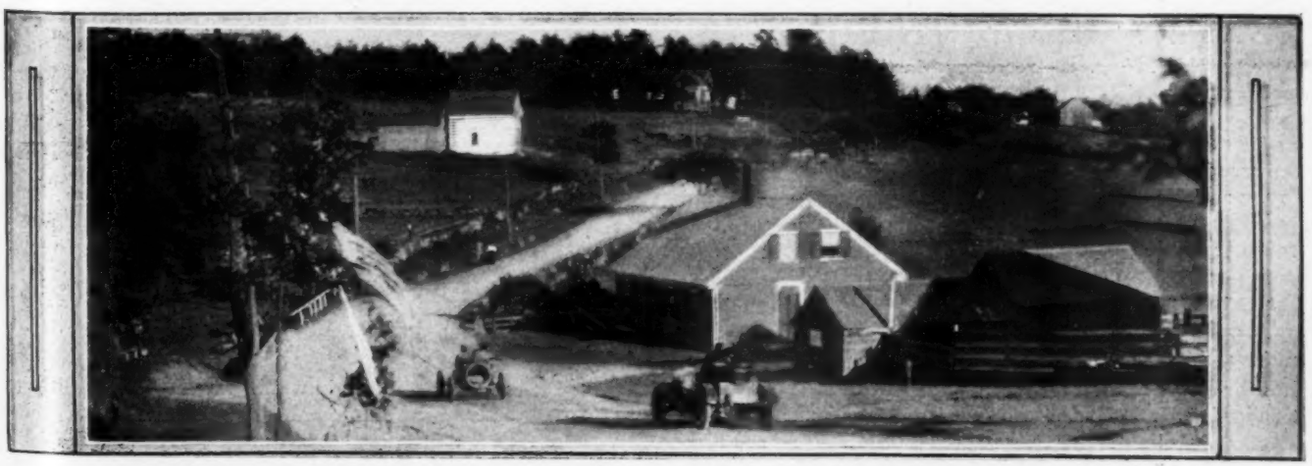
The Moon car, which will be driven by Harry Davis, in the competition for the Yorick cup, is the same stock roadster which was entered in the Indiana light-car race, and there secured fourth place. Previous to that it had been in another road race, and there won second place, driven by Harold Brinker. This latter was the Denver road contest, in which he made a run from a position near the rear right up to the second place.

One of the late cars to be entered will undoubtedly be a strong favorite, both because of itself and of its driver. The machine is a 50-horsepower stock Simplex, and it will be handled by George Robertson. This model is the one used by Robertson in winning a number of victories in stock-car events, notably two recent 24-hour races, and in one of these establishing the world's record of 1,177 miles. It will be seen next week in the big race on Wednesday.

### One Unfortunate Fatality in First Practice

LOWELL, MASS., Aug. 31—Much to the regret of all concerned the practice opened to-day with a fatality, and this happening has cast a gloom over the few drivers already on the course. This morning the Chalmers, driven by Joe Matson, just as he was going to practice, struck and fatally injured a boy on Varnum avenue. No blame, however, is placed on Matson, as he did everything in hi power to prevent the accident. So violently did he apply the brakes that the differential and wheel clutches were entirely destroyed. Reliable reports state that the boy tried to run across the road, and seeing the machine approaching, lost his head and remained rooted to the spot. Matson tried to avoid him, but just before the car reached him the boy jumped directly in front of the machine. The radiator of the car was demolished, so severe was the impact. As a result of the accident, Matson is now under a $2,000 bond.

A petition for an injunction to prevent the holding of the races was filed to-day in the Superior Court. The attorney, E. J. Tierney, represents Mrs. O. A. Gray, an owner of real estate along the course, who claims that her property will be damaged by the speeding autos. It was claimed that the act of the Legislature permitting the event is unconstitutional, and Judge Dana issued an order of notice, returnable on Thursday. The complaint is directed against the Lowell Automobile Club, the officers of which are not inclined to believe the injunction will be made permanent at this late hour.



Deep Dip on the Back Stretch, Which Is the Most Dangerous Part of the Whole Course

## H. O. SMITH ON GLIDDEN TOUR PROTEST

NEW YORK, Aug. 31—In order to make plain the reasons for his protest in connection with the Glidden tour, H. O. Smith, president of the Premier Motor Mfg. Company, has issued a statement wherein he aims to show that if the rules were properly enforced there would be no question about the Glidden trophy going to the Premier. He has declared himself as follows:

"I have been in hopes that the chairman of the Contest Board of the A. A. A. would give out full information, setting forth the conditions surrounding our protest at the conclusion of the Glidden tour, and it is evidently the failure to do this which has occasioned our receiving requests from so many sources to give full facts regarding the protest, which I am satisfied, to avoid a general misunderstanding, the public should know.

"The Premier Company regrets the necessity of making a protest on a point which on the surface might seem so trivial, but a number of cars have proven so good that only small points of vantage could be found by the technical committee at the conclusion of the strenuous run as the basis for determining awards.

"However, this contest was run under stated rules, and the rules specified under "Qualifications," paragraph No. 5:

> Cars shall at all times during the tour carry mufflers and guards, and be fully equipped as per manufacturers' catalog specifications, except that tops and wind shields need not be carried.

"The two roadsters of the same make as the car which was awarded the Glidden trophy, which carried their lamps attached in the same manner as provided on the touring car of that make, suffered in consequence on account of the bad roads, by one having a bent bracket and a badly crushed lamp and the other by having the receptacle in the rear to which the lamp and bracket is attached entirely dragged off.

"The failure to carry lamps was in itself a violation of the rules," continues Mr. Smith, "and, judging by the experience of the roadsters of this make which carried the full equipment, it is fair to assume that the touring cars which did not carry this equipment the entire distance escaped at least as much damage as was done to these two roadsters, and an official report of the penalties shows that the roadster of this make, No. 109, with a total of 10.2 points, was charged, among other things, for replacing tool box, bracket and taillamp, 3 points for time; bracket, 1.2 points for material; taillight, 3.2 points for material; while other cars in the contest were charged for lamps and brackets, and in addition one or more cars were compelled during the technical examination to light their oil lamps to show that they were in good going condition."

In conclusion Mr. Smith says: "Since the Premier car conformed to the rules, and made a perfect road score, and at the conclusion suffered a penalty of only one and a half point, on account of broken spring clip and reapplying fan belt, a proper charge for lamp only would alter the final score and make the award favorable to the Premier."

## DETOUR ON ALBANY-PITTSFIELD ROUTE

ALBANY, N. Y., Aug. 30—Secretary Martin of the Albany Automobile Club advises tourists going from Albany to Pittsfield or vice versa of a detour necessary from the village of East Schodac to Nassau, a distance of five and a half miles, due to the reconstruction of the road. The Albany club has erected signs showing a serviceable route around the closed section. With this exception all of the roads on the Albany-Pittsfield route are in excellent condition.

## MITCHELL ARMY CAR ON THE PRAIRIES

Carrying army dispatches from New York to San Francisco, the Mitchell Ranger, which left the former city on August 19, is now on the open prairies of the West. It reached Chicago on the following Tuesday, and proceeded on the next day to reach Iowa. That State was crossed during the remainder of the week, and Nebraska entered. Latest reports locate the machine near the Wyoming line.

## CORONER BLAMES TRACK MANAGEMENT

INDIANAPOLIS, Aug. 28—Blame for the accidents that occurred during the recent race meet at Indianapolis, resulting in the death of five persons, has been placed on the management of the Indianapolis Motor Speedway by John J. Blackwell, coroner of Marion county.

Of the accident that occurred when the National car driven by C. C. Merz bursted a tire, killing Clyde Kellum, the machanician, and two spectators, the coroner says:

"I find that the protection of the spectators and the public who paid their admission fee to see the races was very lax. There was no discipline among the guards and soldiers stationed there to guard the public from danger. I find also that there were danger signs and placards around the track and the Indianapolis Motor Speedway Company knew the dangerous condition that existed there and should have afforded the public more and better protection from death and accident."

In his verdict relative to the deaths of William A. Bourque, driver of the Knox entry and his mechanician, Harry Holcomb, the coroner stated that he expected to recommend that the accident be investigated by the grand jury.

In preparation for the next meet, to be held in October, the Speedway management is planning to resurface the track with bitu-mineral paving material, and changes will also be made in the rearrangement of the private grand stands to assure greater safety.

## WINNERS, STEAM AND GASOLINE WHITES

CHICAGO, Aug. 30—The second annual gymkhana was held at the Wheaton County fair, Saturday, under the management of a committee from the Chicago Motor Club, and a White steamer driven by Paul Melchert was returned the winner, with a White gasoline car handled by G. W. Turgeon second. J. H. Seek's Premier was third, a Silent Knight Daimler fourth, Diamond T fifth, Falcar sixth, Overland seventh, Austin eighth, Peerless ninth, Buick tenth, Columbia eleventh, Halladay twelfth, De Tamble thirteenth, and a Knox fourteenth. The gymkhana was made up of five sections, starting with an obstruction race in which the driver carried a glass of wine and steered with one hand; then came the motor roulette, circus ring, lancers and the teter board. On the last-named just half the cars succeeded in balancing. This was the first public appearance in Chicago of the White gasoline car and the Daimler, the latter being an English machine.

## JACKSON COMPANY SUES FOR CUP

INDIANAPOLIS, Aug. 30—The Jackson Auto Company has filed suit against the Indianapolis Speedway Company and the Wheeler-Schebler Company for possession of the $10,000 cup offered by the latter company to the winner of the 300-mile race. A Jackson car was in the lead when the race was stopped at 235 miles because of the accident that caused the loss of three lives. The Jackson people also sue for $100,000, which amount of damage they claim has been done them through the withholding of the prize. Just what action the Speedway Company will take is not stated. The A. A. A. officials decided upon a "no-race."

## BALTIMOREANS WILL USE PLENTY OF OIL

BALTIMORE Aug. 30—Street Cleaning Commissioner Wickes says that with his experiment of laying the dust in the city streets with oil, he has at last mastered that evil, which has been for years a bane to Baltimoreans. This process will be in constant use hereafter. The Commissioner has also been experimenting with oil on the macadam roads within the city limits with the view of saving the roads from the havoc wrought by autos, and he says that he finds the oil scheme the best preventative. The result is that he has advocated oil-covered macadam roads for all residential sections of the city.

Brilliant Scene at the Start of the Round-the-Clock Grind, with Ten Fine Cars in the Line-Up

# RENAULT WINS FATAL BRIGHTON TWENTY-FOUR

NEW YORK, Aug. 28—Many accidents, one doubly fatal, distinguished the second Brighton Beach twenty-four-hour race conducted by the Motor Racing Association this season. Shortly before midnight Friday the Stearns driven by Grosso collided with Patschke's Acme on the clubhouse turn. Grosso was mortally injured and Leonard Cole, his mechanic, was killed outright. The Acme crew was uninjured. Grosso died Sunday morning without recovering consciousness.

The Renault driven by Basle and Raffalovitch won with a score of 1,050 miles, 41 miles behind Robertson's performance in the July race, and 127 miles behind the record. Rainier, again a consistent performer, finished second with 938 miles; Acme No. 3, driven by Patschke, took third with 883 miles, and Palmer-Singer, Allen-Kingston and Acme No. 4 finished in the order named. Lozier, Fiat and Stearns were eliminated by accidents, and Houpt dropped out early in the race. Michelin tires were used on first and second cars.

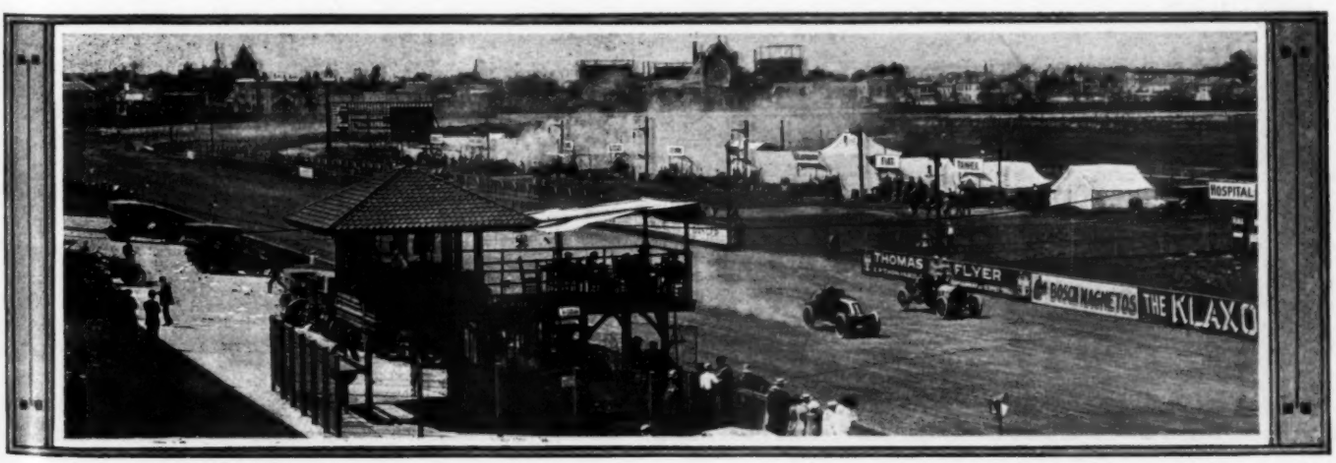
The start at 10 P.M., Friday night, afforded the usual picturesque features, and was attended by a record-sized crowd. The association's repeated prediction of a record-breaking entry again proved unfounded, as but ten machines lined up for the starter's pistol. De Palma and his Fiat got away in the lead, and finished the first five miles in 5:32 3-5. Patschke in Acme No. 3 led at the end of the first hour, and his score of 55 miles proved sufficient to win him the $200 prize for the best hour. Van Tine's Acme No. 4 made the same distance in a few seconds more.

Then the acccidents began. The Allen-Kingston lost a rear tire on the upper turn and was struck by the Fiat. The impact burst the gasoline tank of the A-K, and instantly the car was enveloped in flames. Hughes and his mechanic leaped from the car, blazing like human torches, and rolled in the grass of the infield. Both were painfully burned, but Hughes later appeared on the track again. The Fiat's frame was twisted and cracked, and its springs broken, putting it out of the race.

A few minutes later came the fatal accident. At the clubhouse turn the Stearns collided with the Acme, and instantly all was a terrible confusion. The car turned a somersault and was smashed into fragments. Leonard Cole, the mechanic, was frightfully mangled, and Grosso's back was broken. The two twisted forms

**HOW THE POSITIONS SHIFTED HOUR BY HOUR IN THE 24-HOUR RACE AT BRIGHTON BEACH, N. Y., AUGUST 27-28**

| No. | Car | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Renault | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | Rainier | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3 | Acme | 1 | 9 | 6 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 |
| 2 | Palmer-Singer | 4 | 5 | 3 | 3 | 3 | 4 | 4 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4 |
| 8 | Allen-Kingston | 5 | 10 | 8 | 8 | 6 | 6 | 6 | 6 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 4 | 4 | 3 | 5 | 5 |
| 4 | Acme | 1 | 4 | 5 | 4 | 4 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 5 | 4 | 5 | 6 | 6 | 6 | 6 |
| 5 | Lozier | 4 | 2 | 4 | 6 | 7 | 7 | 6 | 5 | 6 | 6 | 7 | Turned over on backstretch. | | | | | | | | | | | | |
| 7 | Houpt | 10 | 6 | 7 | 7 | 8 | 8 | 7 | 7 | 8 | Burned out connecting rod. | | | | | | | | | | | | | | |
| 9 | Fiat | 2 | 8 | Frame and springs smashed in collision. | | | | | | | | | | | | | | | | | | | | | |
| 6 | Stearns | 3 | 7 | Wrecked. | | | | | | | | | | | | | | | | | | | | | |




Leading Renault and the Allen-Kingston Have a Brush About Noon—Paddock in the Background


lay near the wreck of the car for some moments while the other cars were signalled to stop. The ambulance took away the Stearns crew, one dead and the other dying, and the pieces of the big car were pulled into the field. Patschke in the Acme had retained control of his car, and drove to the paddock, where the front axle and construction was replaced. The Renault had been in the mix-up, too, and its steering cross-rod had to be straightened.

The race was resumed at 11:40, and half an hour later the front wheel of Acme No. 4 gave way while rounding the clubhouse turn. With great presence of mind Van Tine steered the car through the canvas fence and brought it to a stop, avoiding a mix-up with the pursuing cars. At the end of the second hour the Rainier led, scoring 100 miles. About 1 a. m. the Lozier, driven by Heina, blew a tire and broke a wheel on the far turn and upset; the driver and mechanic were thrown across the track, but picked themselves up with only a few bruises. The two Acmes were both on the track an hour after the accident and started to make up lost time. The driving of both Patschke and Van Tine was of the sensational order. About daybreak the Allen-Kingston in leaving the paddock upset a lamp post, which struck Patrick Corrigan, a policeman, and put him on the hospital list with a fractured leg and dislocated knee.

During the eighth hour the Renault, carefully driven by Basle, overtook the Rainier and gradually drew into the lead, despite the latter car's desperate sprinting. Van Tine's Acme was in third place and the Palmer-Singer fourth. The Lozier, which had reappeared, was put out of the race for good at 8:25. Its left rear tire burst on the turn into the backstretch and it went through the fence, breaking its front axle. Heina and his mechanic again escaped unhurt. About the same time the Houpt burnt out its connecting rod bearing and was withdrawn.

Charles Basle in the Winning Renault—Just After Finishing

Laurent Grosso and Leonard Cole, in the Unfortunate Stearns

| ENTRIES | 1 HOUR | 2 HOUR | 3 HOUR | 4 HOUR | 5 HOUR | 6 HOUR | 7 HOUR | 8 HOUR | 9 HOUR | 10 HOUR | 11 HOUR | 12 HOUR | 13 HOUR | 14 HOUR | 15 HOUR | 16 HOUR | 17 HOUR | 18 HOUR | 19 HOUR | 20 HOUR | 21 HOUR | 22 HOUR | 23 HOUR | 24 HOUR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 RENAULT | 53 | 97 | 146 | 197 | 242 | 289 | 338 | 382 | 431 | 478 | 520 | 568 | 612 | 655 | 695 | 743 | 783 | 829 | 869 | 910 | 953 | 995 | 1021 | 1050 |
| 2 PALMER-SINGER | 46 | 85 | 127 | 174 | 217 | 237 | 263 | 283 | 295 | 342 | 383 | 424 | 465 | 509 | 549 | 593 | 637 | 672 | 676 | 701 | 735 | 779 | 824 | 870 |
| 3 ACME | 55 | 60 | 93 | 146 | 169 | 188 | 233 | 268 | 294 | 345 | 395 | 442 | 492 | 539 | 587 | 636 | 683 | 732 | 770 | 774 | 774 | 785 | 835 | 883 |
| 4 ACME | 55 | 90 | 113 | 161 | 212 | 251 | 299 | 343 | 386 | 424 | 469 | 512 | 566 | 577 | 615 | 626 | 626 | 659 | 676 | 679 | 721 | 746 | 746 | 760 |
| 5 LOZIER | 46 | 99 | 123 | 123 | 123 | 134 | 176 | 226 | 274 | 322 | 324 | | | | | | | | | | | | | |
| 6 STEARNS | 52 | | | | | | | | | | | | | | | | | | | | | | | |
| 7 HOUPT | 22 | 72 | 78 | 100 | 113 | 113 | 116 | 155 | 168 | 168 | 168 | | | | | | | | | | | | | |
| 8 ALLEN-KINGSTON | 44 | 54 | 66 | 96 | 132 | 174 | 176 | 220 | 257 | 295 | 335 | 379 | 420 | 457 | 500 | 540 | 582 | 615 | 657 | 701 | 741 | 786 | 823 | 866 |
| 9 FIAT | 53 | 63 | | | | | | | | | | | | | | | | | | | | | | |
| 10 RAINIER | 52 | 100 | 151 | 201 | 246 | 295 | 342 | 382 | 402 | 428 | 436 | 479 | 526 | 574 | 621 | 668 | 712 | 742 | 776 | 810 | 841 | 858 | 899 | 938 |

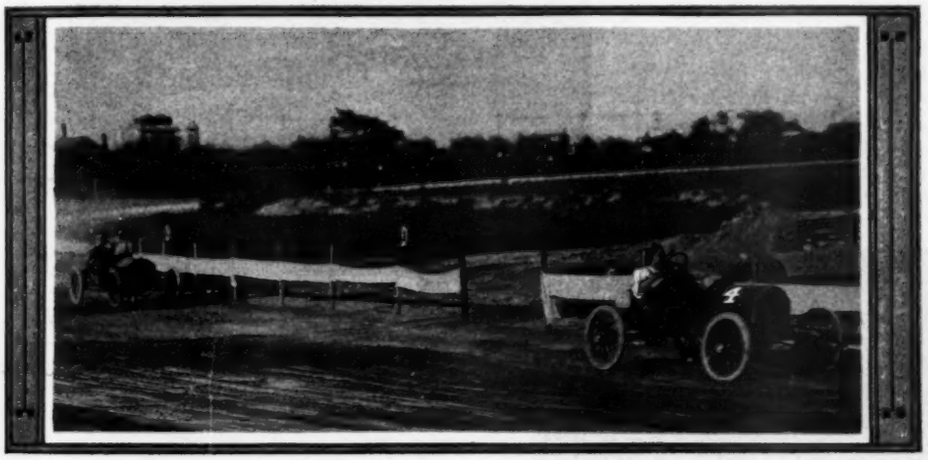
Scoreboard Could be Read from the Grand Stand—This Photograph Taken by Night, After the Finish

The succession of accidents now was broken, and the remaining six cars continued to the end of the race. The Renault steadily increased its lead over the Rainier, and the latter opened up a wider gap on the rest of the field. Basle settled down to a humdrum pace, and the race assumed the aspect of a procession. A good-sized crowd assembled in the evening and divided its attention between Patschke's sprinting and Pain's fireworks, which were visible over the fence. The finish lacked enthusiasm, and the crowd quickly scattered to other attractions.

In the preliminary events Friday afternoon Woltman in the Hupmobile won the six-hour race, making 226 miles, after Adams and the S. P. O. had been disqualified for dirty work on the turns. Adams was suspended for thirty days. The other S. P. O. was second with 212 miles. De Palma and the Fiat "Cyclone" won the five-mile in 5:14 3-5, with Kilpatrick and the Hotchkiss second, in 5:16 4-5. In getting off on a false start the "Green Dragon" driven by Gilhooly went through the fence on "Death Turn," owing to the edge of the cement surface breaking his wheel. The "Red Devil" driven by Charles Bowers stopped on the backstretch and did not finish.

Walter Christie with his front-drive racer, gave an exhibition mile trial, but the best time he dared make was 57 4-5. His car called forth some applause, and it was evident that it could have gone faster if it had been able to hold the track. De Palma made two attempts in his Fiat "Cyclone," making 57 flat and 55 4-5 on the second trial.

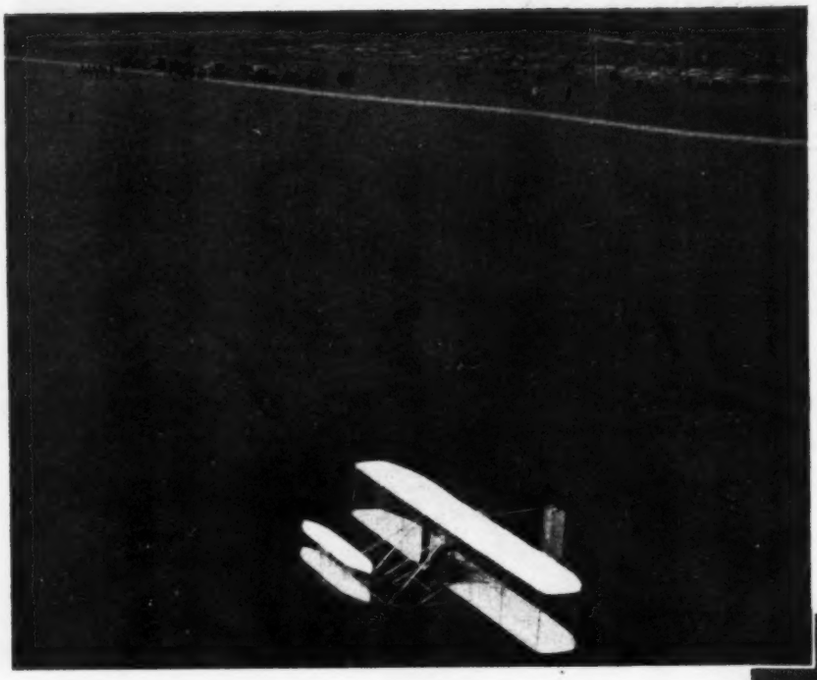
| No. | Car | Drivers | H.P. | Cyl. | Drive | Tires |
|---|---|---|---|---|---|---|
| 1 | Renault | Basle<br>Raffalovich | 42 | 4 | Shaft | Michelin |
| 2 | Palmer Singer | Lescault<br>Howard | 57 | 6 | Shaft | Diamond |
| 3 | Acme | Patschke<br>Dearborn | 60 | 6 | Chain | Goodrich |
| 4 | Acme | Van Tine<br>Bowers | 51.6 | 6 | Chain | Goodrich |
| 5 | Lozier | Cobe<br>Heina | 51.6 | 6 | Shaft | Diamond |
| 6 | Stearns | Grosso<br>Mulford | 46 | 4 | Chain | Diamond |
| 7 | Houpt | Robertson<br>Poole | 48.4 | 4 | Shaft | Michelin |
| 8 | Allen Kingston | Hughes<br>Lawwell | 48.4 | 4 | Shaft | Diamond |
| 9 | Fiat | DePalma<br>Parker | 42 | 4 | Chain | Michelin |
| 10 | Rainier | Disbrow<br>Lund | 40 | 4 | Shaft | Michelin |



Hupmobile Winner and the S. P. O. Turning Into the Home Stretch

Despite numerous protests, and the condemnation of the daily press, the Motor Racing Association announces that it will hold a third race in September during the Hudson-Fulton celebration. The association denies that the condition of the track was responsible for the accidents, and says that they might just as well occurred if the track had been a hundred miles in circumference. However, there were some very bad spots later in the race. The Rainier Motor Company has made public a resolution not to participate in any more twenty-four hour races, being convinced that under present conditions such races are dangerous and against public sentiment. Others will doubtless follow its lead.

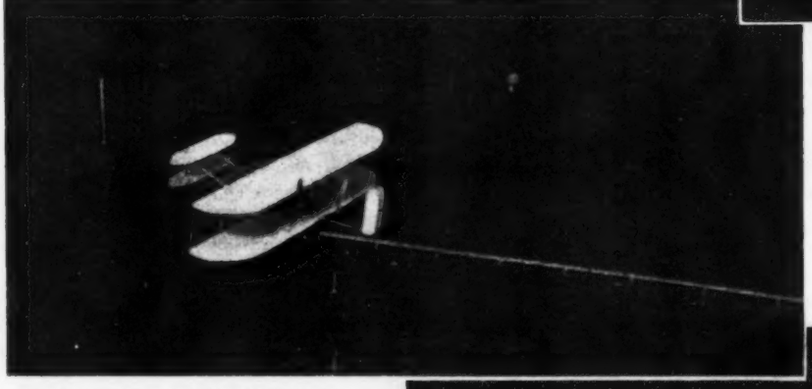
Parking Spaces Filled with Large and Expensive Private Automobiles



Wright Aeroplane in Flight: Photograph Was Taken from a Balloon

## CURIOUS PHOTOS OF WRIGHT AEROPLANE

Photographing one air craft from another is still a novelty, and these pictures taken from a balloon, have the additional merit of depicting more clearly than otherwise would be possible the appearance and proportions of the Wright aeroplane and the method of launching it into the air. The arrangement of the front and rear rudders, the pylon and starting rail are all plainly visible, as well as the position of the operator. In one photograph even the rapidly turning propellers can be distinguished.



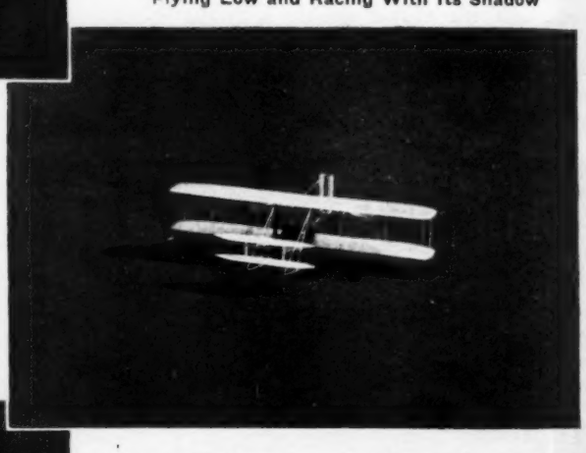
Just Leaving the Starting Rail

In the lower photograph the machine has just been placed in position on the starting rail, and the weight, the fall of which provides the initial impulse, is being hoisted to the top of the tower. A rope runs from the weight through the pulley at the top of the tower, thence to the ground, under the starting rail to a pulley at the far end, and then back to the aeroplane, to which it is connected by a catch that is automatically released at the end of the rail. In one of his flights at Fort Myer, however, Orville Wright succeeded in starting from the rail without the use of the falling weight, the thrust of the revolving propellers proving sufficient to take the machine off in good shape. It is predicted that the Wrights will soon discard the weight altogether.

Another photograph shows the machine just leaving the end of the rail. The forward lifting planes have been tilted so as to raise the front edge of the main planes; the greater lifting effort resulting from their increased angle then raises the machine gently in the air. If the wind is favorable it is often not necessary to run the full distance before taking flight.

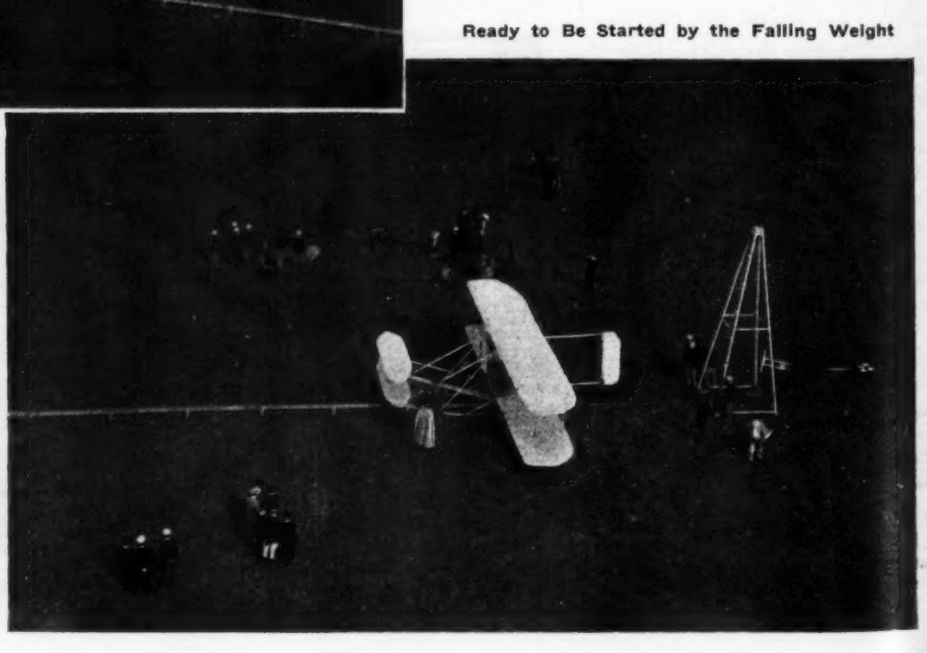
One of the surprises of the Rheims aviation meet was the skilful work of Lefebvre, who in ten days taught himself to operate his Wright machine. He made his first trials on the broad meadows of Holland. First he balanced the machine on a pivot in a wind blowing 10 feet a second, and endeavored to handle the horizontal rudder and the flexible wing tips in such a way as to maintain it in equilibrium. Then he had

Flying Low and Racing With Its Shadow



laid a rail about 90 yards long, and got several mechanics to push him along it while he maneuvered the rudders. At last he gained sufficient confidence to start the motor, and then, one fine day, he flew away. A few days later he took his machine to Rheims and won. Everyone who has ever ridden in a Wright aeroplane has commented on the ease with which it is controlled.

Ready to Be Started by the Falling Weight



# RHEIMS TOURNAMENT AFFORDS GLORIOUS SPECTACLE

RHEIMS, Aug. 29—Marvel has succeeded marvel in the aviation meet on Bétheny Plain. Aeroplanes by the score have flown there; skimming the ground with planes gleaming white in the sun; soaring majestically against a background of crimsoned clouds, or darting, a narrow line of black, across the face of the harvest moon. Never before in history have such scenes been witnessed. Stevenson's locomotive, Fulton's steamboat meant but the spreading of man's dominion on earth. Now we have conquered the air.

The simple, matter-of-fact way in which this aviator or that orders out his machine, guides it into the air and takes a spin around the course leaves the spectator with the feeling of having just awakened from a Rip Van Winkle nap. These wonderful craft start in flight as easily as any bird; they soar high, or ripple the tall grass with their wind, as their masters please; they pass each other in every direction, crossing above or below, sometimes tossing in each other's wakes; again two or three race neck and neck at express-train speed. The mechanics, who turn their backs on any ordinary flight, the hangers-on, the race-going populace, speak a jargon of planes, tails, equilibrium, air currents, which one a year ago would have thought the ravings of a lunatic. An aviator brings his machine to earth in front of its shed and asks for his time on the lap; the crowd presses around and comments critically. Even the bookmakers are here, quoting odds on Curtiss or Bleriot. Aeroplanes of the Wright, Voisin, or Bleriot types are sold at list prices, and the buyers squabble over deliveries.

Each day has seen its heroes. Monday, Curtiss made a record for the course. Tuesday, Bleriot broke it. Wednesday, Paulhan broke all records both for distance and time in the air. Thursday, Latham made a new record of ninety-six miles, though in less time than Paulhan's trip. Then both were surpassed by Farman on Friday, when he traveled more than 112 miles, only stopping because of the darkness. Saturday, Curtiss won the International Cup, the greatest prize of the meet, and Bleriot made a new record for a single lap. On the last day Curtiss set a record for three laps; Latham ascended to a height of 500 feet, and Farman carried two passengers around the course at a speed of 35 miles an hour.

Accidents have been remarkably few, and none serious. Several aeroplanes were more or less smashed. Bleriot was the most unlucky; Thursday he ran his big 80-horsepower monoplane into a fence while trying to land in front of the grandstand, breaking its wings and propeller, and Sunday, while in full flight with his smaller machine, the rudder failed to respond, with the result that the machine crashed to the ground, the burst gasoline tank caught fire, and the aviator was painfully burned. Fournier, the hero of many automobile races, suffered a broken nose. Other aviators occasionally bumped fences or hay-stacks, but without serious consequences.

The races were arranged and conducted in such an orderly manner that it has been possible to make a complete summary of them, and even to figure the scores of the aviators and the types of machines, as in a track meet. Latham and the Antoinette monoplane are the largest individual scorers, but in totals the biplanes surpas sthe monoplanes.

### THE SUMMARY OF RHEIMS

**Prix de la Vitesse: 3 laps, 30km. (18.6 mi.)**

| Pos. | Aviator | Aeroplane | Time |
|---|---|---|---|
| 1 | Curtiss | Curtiss | 23:29 |
| 2 | Latham | Antoinette 29 | 25:18 1-5 |
| 3 | Tissandier | Wright | 28:59 1-5 |
| 4 | Lefebvre | Wright | 29:00 |
| 5 | De Lambert | Wright | 29:02 |

**Prix du Coupe Internationale: 2 laps, 20 km. (12.4 mi.)**

| | | | |
|---|---|---|---|
| 1 | Curtiss | Curtiss | 15:50 3-5 |
| 2 | Bleriot | Bleriot | 15:56 1-5 |
| 3 | Latham | Antoinette | 17:32 |
| 4 | Lefebvre | Wright | 20:47 2-5 |

**Prix du Tour de Piste: 1 lap, 10 km. (6.2 mi.)**

| | | | |
|---|---|---|---|
| 1 | Bleriot | Bleriot | 7:47 4-5 |
| 2 | Curtiss | Curtiss | 7:48 2-5 |
| 3 | Latham | Antoinette 29 | 8:20 3-5 |
| 4 | Latham | Antoinette 13 | 8:32 3-5 |
| 5 | Lefebvre | Wright | 8:58 4-5 |

**Prix de la Champagne: Greatest Distance**

| | | | km. | (mi.) |
|---|---|---|---|---|
| 1 | Farman | Farman | 180 | (112) |
| 2 | Latham | Antoinette | 155 | ( 96) |
| 3 | Paulhan | Voisin | 131 | ( 81) |
| 4 | De Lambert | Wright | 116 | ( 72) |
| 5 | Latham | Antoinette | 111 | ( 69) |
| 6 | Tissandier | Wright | 111 | ( 69) |

**Prix de l'Altitude: Greatest Height**

| | | | m. | (ft.) |
|---|---|---|---|---|
| 1 | Latham | Antoinette | 155 | (494) |
| 2 | Farman | Farman | 110 | (361) |
| 3 | Paulhan | Voisin | 90 | (295) |
| 4 | Rougier | Voisin | 55 | (180) |

**Prix des Passagers: 1 lap, 10 km. (6.2 mi.)**

| | | | |
|---|---|---|---|
| 1 | Farman | Farman, 2 pass. | 10:39 |
| 2 | Farman | Farman, 1 pass. | 9:52 4-5 |
| 3 | Lefebvre | Wright, 1 pass. | 11:20 4-5 |

**Prix des Dirigibles: 5 laps, 50 km. (31 mi.)**

| | | | |
|---|---|---|---|
| 1 | Kapferer | "Col. Renard" | 1:19:49 1-5 |
| 2 | De la Vaulx | "Zodiac" | 1:25:01 |

### INDIVIDUAL SCORES OF THE RHEIMS MEET

| Aviators | Firsts (5 pts.) | Seconds (3 pts.) | Thirds (2 pts.) | Fourths (1 pt.) | Total |
|---|---|---|---|---|---|
| Latham | 1 | 2 | 2 | 0 | 15 |
| Curtiss | 2 | 1 | 0 | 0 | 13 |
| Farman | 2 | 1 | 0 | 0 | 13 |
| Bleriot | 1 | 1 | 0 | 0 | 8 |
| Lefebvre | 0 | 1 | 0 | 3 | 6 |
| Paulhan | 0 | 0 | 2 | 0 | 4 |
| Tissandier | 0 | 0 | 1 | 0 | 2 |
| De Lambert | 0 | 0 | 0 | 1 | 1 |
| Rougier | 0 | 0 | 0 | 1 | 1 |
| **Aeroplanes** | | | | | |
| Antoinette | 1 | 2 | 2 | 1 | 16 |
| Curtiss | 2 | 1 | 0 | 0 | 13 |
| Farman | 2 | 1 | 0 | 0 | 13 |
| Wright | 0 | 1 | 1 | 4 | 9 |
| Bleriot | 1 | 1 | 0 | 0 | 8 |
| Voisin | 0 | 0 | 2 | 1 | 5 |

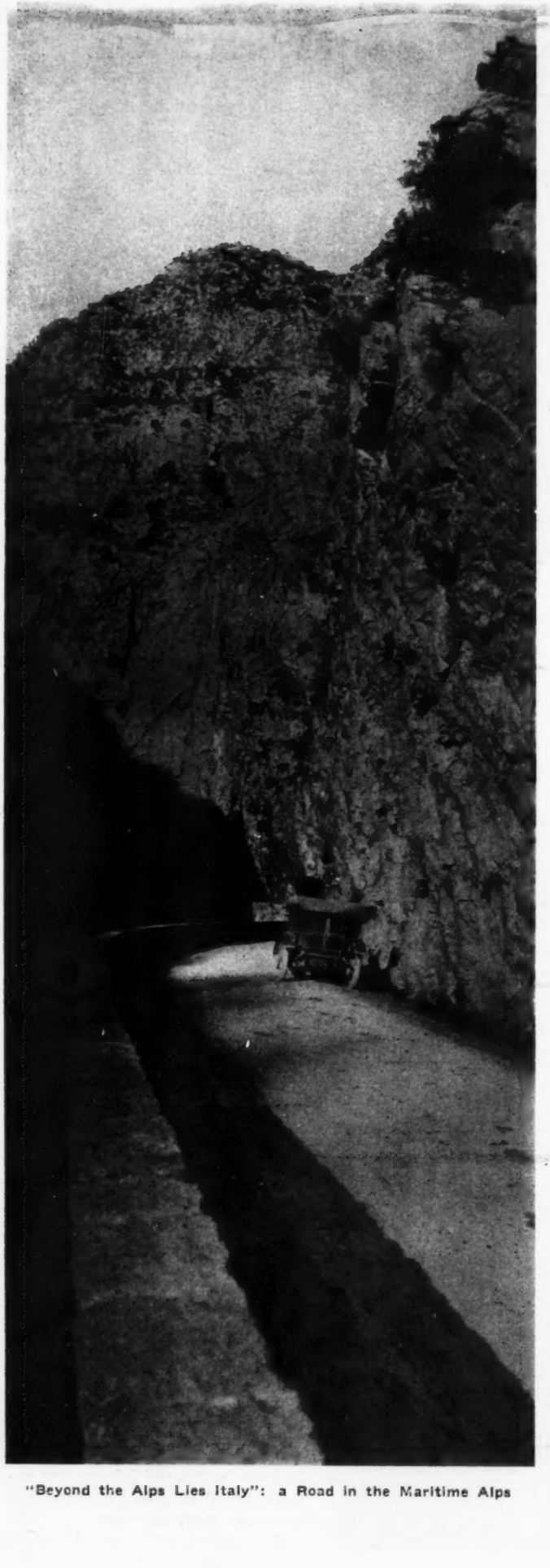
## BLERIOT'S MACHINE WILL BE HONORED

PARIS, Aug. 29—When it comes back from England, Bleriot's most successful flying machine will be given an honored position in the Arts and Metiers Museum in Paris, where it will have as companions Wilbur Wright's original flyer, with which he made all his records in France, Ader's flying machine, the first in Europe to rise from the ground, and Cugnot's steamer, the precursor of the automobile. Louis Bleriot preferred to sell his machine to the City of Paris for $2,000 in preference to disposing of it in England for ten times that amount. The price he is obtaining for it from the French authorities is the actual cost of production, this type of machine now being sold for $2,000.

Although having a well-equipped factory, and a business organization behind him capable of handling orders on a large scale—for Bleriot is also the head of an auto lamp factory.

## CODY SUCCEEDS WITH BRITISH FLYER

LONDON, Aug. 29—This country may at last claim to possess a successful aviator, for S. F. Cody has vindicated the claims so long made for his army aeroplane. Recently the machine made three two-mile circuits of Laffans Plain. Subsequently, this performance was repeated and a six-mile cross-country journey was successfully essayed. This last trip was accomplished with the machine carrying ballast to represent a passenger, so that afterward passenger flights were frequently tried. Mr. Cody has entered for the Liverpool to Manchester £1,000 prize. The machine is of the tailless biplane type and is one of the heaviest that has yet been constructed, weighing over one ton. The framework is made of bamboo struts with metal joints. The engine is an eight-cylinder E. N. V. of 80-horsepower, operating by chains two propellers situated between the main planes.



"Beyond the Alps Lies Italy": a Road in the Maritime Alps

## ITALY AS A TOURING GROUND

Cortlandt Field Bishop has been an inveterate European tourist for a number of years, and being of an observing nature, he has frequently supplied information which has been of much value to other automobilists in their travels abroad. Recently, Mr. Bishop completed a tour of Italy, and in an article printed in the Paris edition of the New York *Herald*, he comments as follows:

"Speaking generally, roads in Italy have improved during the last few years and are becoming better. In many parts, notably around Milan, Naples and Turin, the steam roller is employed. Improvements have also been made in gradients.

"The rule of the road in Italy is rather a troublesome question to automobilists owing to its lack of uniformity. This is a relic of the time when Italy was divided into a number of independent states. Before the advent of the automobile, when traffic was only local, this absence of uniform regulations was not of much consequence. But when automobiles began to tour through the country they quickly discovered its inconvenience. It was frequently impossible to know when one passed from one former political division into another, and, consequently, whether to continue to keep to the right of the road or to change over to the left or vice versa.

"This uncertainty partially disappeared a few years ago with the passing, largely through the efforts of the Touring Club of Italy, of a law requiring all traffic to keep to the right, as in France and America. At the same time a kind of local option in the matter was granted to cities of a certain size. It was stipulated, however, that where the general rule of the road was not in force that fact should be plainly indicated at all the octroi stations. Rome, Milan and Genoa took advantage of the option, and within the limits of these cities vehicles must keep to the left and pass each other on the right.

"Although the rules of the road have thus been simplified in Italy, it is still necessary to use caution, especially in the neighborhood of large cities. The peasants are gradually getting accustomed to automobiles, but the country people, in their high, narrow, two-wheeled carts, have not lost the habit of sleeping on the road, and if they awaken at the sound of a horn are just as liable to pull to the left as to the right. Heavy ox teams also cause a considerable amount of obstruction, while in the vicinity of large cities the presence of cyclists, who are more numerous in Italy than in France, necessitates careful driving.

"Automobilists touring in Italy have at their disposal, thanks to the T. C. I., a better and more complete series of road maps and road information than in any other country in Europe.

"The Touring Club's latest achievement is the publication of the first part of a road map of Italy, designed solely for the use of automobilists. The main roads are marked out in bold red lines, with the distances given between the principal points. This is accompanied by a pamphlet which shows the best routes for passing through and in or out of the principal cities of Italy. The main thoroughfares to be used in passing through are printed in red letters.

"The Simplon was the first modern carriage road to be built across the Alps. It was built by order of Napoleon I after his disagreeable experiences on the Great St. Bernard, although he never crossed it. This road is now a favorite with automobilists.

"There have been some recent changes in the rules regulating the passage over the Simplon Pass by automobiles, and these are not generally known. Until this year it was impossible to enter the pass after 4 o'clock. Now the time is extended to 5 p. m. The time allowed for crossing is four hours and not four hours and a half as is generally supposed. This year the pass was opened to automobiles after May 20, instead of June 15, as formerly was the case. The Simplon is a good piece of engineering; automobiles have been allowed to pass only for the last four years, and the amount of automobile traffic on it can be imagined from the fact that during the four months of last season 550 machines passed over it."

# Automobile Wheels, Rims and Tires

By Thos. J. Fay

ROAD SHOCKS must first be taken by road wheels, through tire contact, and thence the vibrations traverse, spreading out in all directions, from the hubs of the wheels. What happens to the car as a whole may be set aside for the time being, rather with the expectation that there is much to be said of a pertinent character before the wheel subject will be adequately explored. Resilience, that rather indifinite term, is continually used in explaining just how wheels, aided by tires, accomplish the work for which they are placed.

According to Rankine, resilience is synonymous with spring, and "is the quality of mechanical work required to produce the proof strain, and is equal to the product of that strain, by the mean stress in its own direction which takes place during the production of that strain—such stress being either exactly or nearly equal to one-half of the stress corresponding to the proof strain." * * * Rankin goes on to say: "Each solid has as many different kinds of stiffness, toughness, strength, and resilience as there are different ways of straining it; pliability is used as a general term to denote the inverse of stiffness."

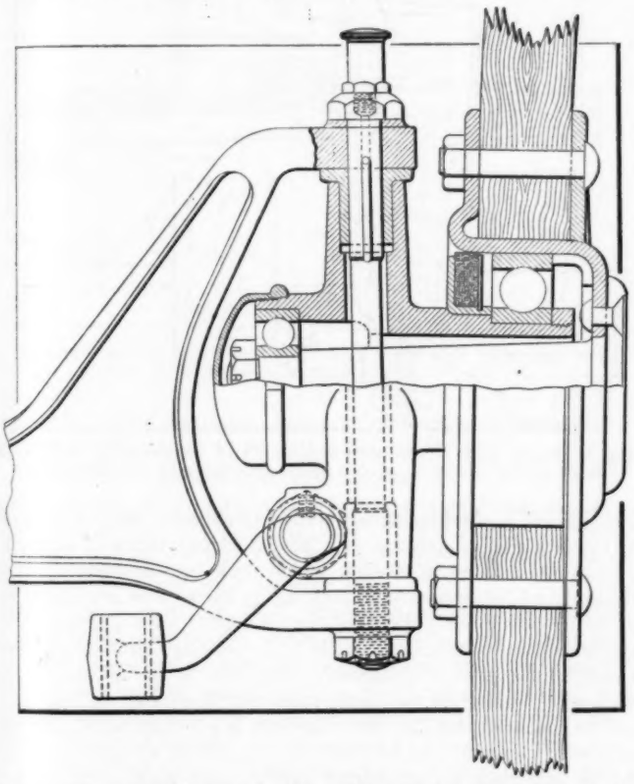


Fig. 1—Example of inverted swivel hub offering advantages in the direction to dispel steering moments

Resilience, then, may be properly used under all sorts of conditions, especially in connection with wheels, rims, and tires, but in the absence of "specifications" the term possesses little or no actual significance. In the same way there are many big words used to describe, in glowing terms, the fine qualities of the wheel-maker's art, nearly all of which fail to afford to this ancient craft a simple measure of "horse sense" which, after all, is the basis of wheel-making, built up, as it is, on a foundation of experience dating from wheels for carts which rolled over the first road built by one of the Pharaohs, during the fourth dynasty, which road was about a mile in length, taking on the features of a causeway, leading up to the sight of the Great Pyramid, the date of which is generally considered to be as early as 4,000 B. C., according to accepted authority.

**Automobile Makers Eliminated the Fifth Wheel**—When the first automobile was designed and constructed the fifth wheel was retained, on which the turning depended, but it was soon found that, at the higher speeds attained by automobiles, this primitive method of steering was attended by dangers. In time it was concluded that when the plane of the steering road wheel is in the plane of the steering pivot, the effect of road inequalities will not be transmitted to the steering gear, or, if a line passing through the center of the road wheel at right angles to the axis of rotation, bisects another line, which, in turn, passes through the turning pivot, provided the point of bisecting is at the point of tire contact with the road, the effect of road inequalities will not be transmitted to the steering gear.

Fig. 1 is offered to show that the ills of road inequalities may be thwarted to a vast extent, in that the road wheel may be very close to the pivot in the knuckle, and the angle of the road wheel, which is usually 1 1-2 degrees out of the vertical, will then be enough to assure that the point of bisecting will be at the point of ground contact of the tire. Fig. 2 is more conventional, representing, in a general way, many of the examples to be seen in actual practice, and in order to indicate more nearly the competence of this plan it is only necessary to glance at Fig. 9, in which the line A O′ passes through the center of the road wheel and the line A′O′ passes through the axis of the knuckle pin, but the lines, so drawn, do not bisect at the point of contact of the tire on the road wheel with the ground. The actual difference is about equal to the radius of the section of the tire, and to this extent the effect of road inequalities will be transmitted to the steering gear, which is made semi-irreversible to compensate for this difference. Absolute irreversibility is not desired since shock would then be augmented.

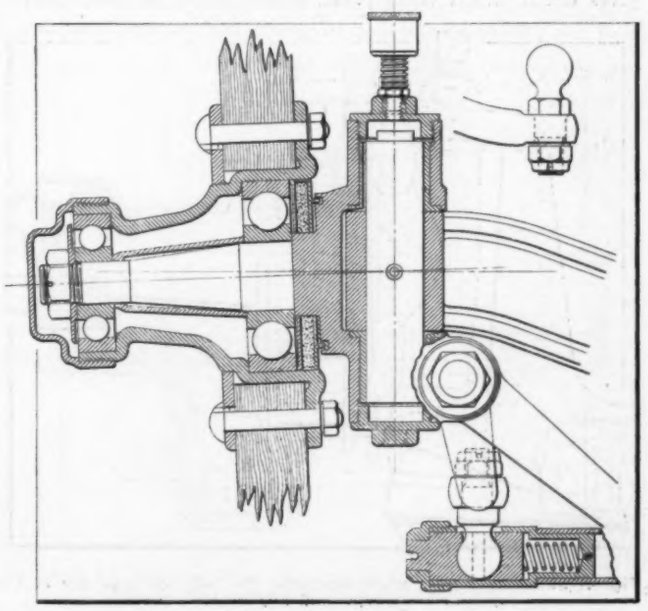


Fig. 2—Example of a conventional steering wheel knuckle, with the road wheel center close to the pivot bolt.

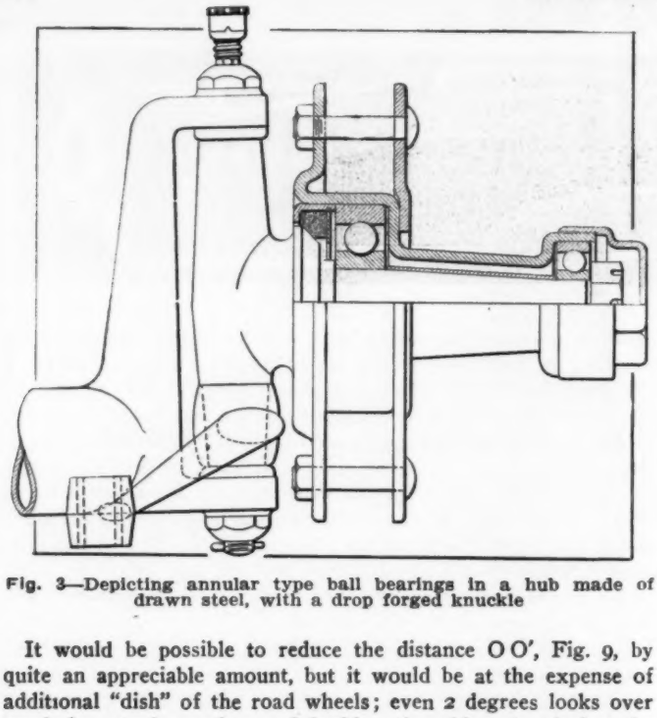


Fig. 3—Depicting annular type ball bearings in a hub made of drawn steel, with a drop forged knuckle

It would be possible to reduce the distance O O′, Fig. 9, by quite an appreciable amount, but it would be at the expense of additional "dish" of the road wheels; even 2 degrees looks over much in actual practice, and besides, the object in placing the wheels out of the vertical plane is to ride the weight of the car on "plumb" spokes, which to do, must take into account the crown of the road, which is never more than 1 degree, and rarely so much. Crown of the roadbed is determined as follows:

Let,

O = equal ordinates in inches.
C = crown in inches.
R = one-half width of the roadway.
D = distance from center to any point in feet.

when

$$O = C\left(\frac{D}{R}\right)^2$$

Frequently the crown of the road, at the center, is on a basis of 9 inches per 100 feet, which represents 3-4 of 1 per cent, and this is about all the difference that should be noticed in any endeavor to render the spokes in the wheels plumb. There is one more point to be considered, i.e., lost motion in the knuckle joints will augment the trouble due to crown of the roadbed, and this, together with the effect of crown, makes it necessary to fix the angle of the wheels, with respect to true vertical plane, 1 1-2 degrees out of the vertical plane, which should be maximum.

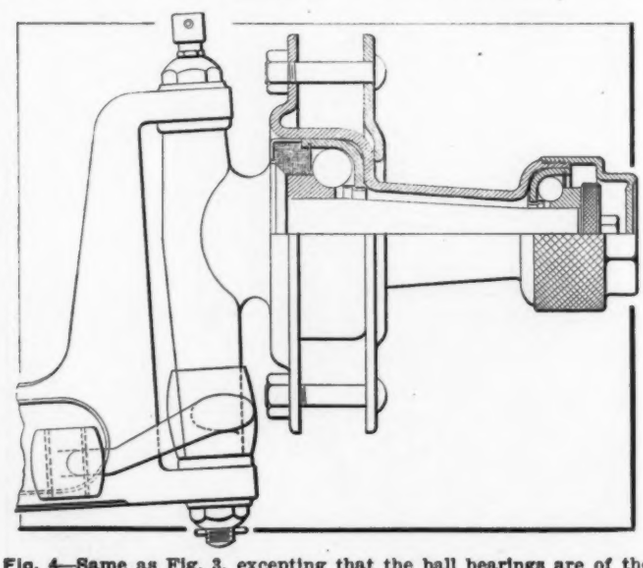


Fig. 4—Same as Fig. 3, excepting that the ball bearings are of the cup and cone type and adjustable at will.

While Fig. 1 depicts a nearly perfect canting knuckle for front wheels, Fig. 2 accords with practice to a considerable extent, referring to the location of the knuckle turning bolt, and a close inspection of the two figures, in contrast, will be enough to show that there is but little difference between them as respects the centers of moments. The design, Fig. 1, is interesting in that it shows how to hide the hub of the wheel so that it will not protrude far outside of the protecting boundary of the pneumatic tire, which may be a good point.

**Hubs Differ in Important Particulars**—Formerly, owing to the extended use of plain bearing artillery types of wheels, the hubs were relatively long, and the general appearance was in some contrast with present practice. Then, hubs were frequently made of cast gray iron, although it was soon found that, for live rear axle types cast iron frequently failed, due to the conditions involved in keying the shaft to the hub. It was found that the relatively small diameter shaft induced a condition of high pressure, and the key burrowed into the cast-iron hubs of the driving wheels. Many failures resulted in this way.

As anti-friction bearings came into vogue, they indicated the need for better hub construction, due in a large measure to the requirements of accuracy, and lightness finally became the goal for all ambitious designers, who, in their desire to eliminate unnecessary flywheel effect, made wheels of increasing strength

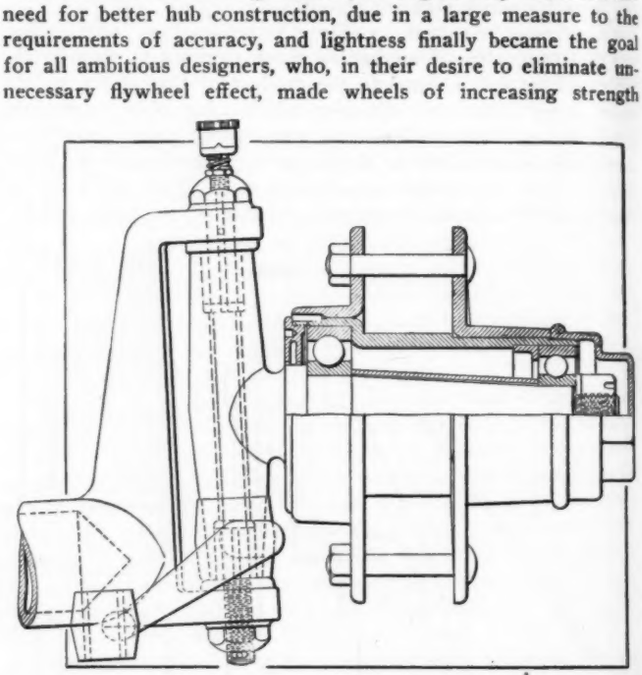


Fig 5—Front wheel hub with annular ball bearings in which the center of the wheel is too far from the center of the knuckle pin

and gained a double victory, since lightness was a natural sequence. Fig. 2 indicates just how lightness followed strength, due to the scheme of design, which took into account an even thickness of hub-walls. The same figure shows how annular types of ball bearings may be properly mounted, with provision for clamping the inner races, which is a necessity, although, in this example, the plan is penalized since there is no allowance for axle-wise floating of the outer raceway. Referring to Fig. 10 it will be observed that the outer raceway is provided with adequate axle-wise clearance, as indicated by a a, which allowance should not be less than 0.5 millimeter (about 0.020 inch).

**A Safety Washer Should Be Used in Every Case**—Considering annular types of ball bearings, it is desirable to use a safety retainer (washer) in front of the outer ball bearing, back of the hub nut, as shown in Figs. 2 and 11. This washer will prevent the bearing from dissembling even if a ball does crumble, however remote this contingency really is. Fig. 5 shows defective designing in that the safety washer is not present; outer races are cramped, and the spacer between the inner racs is so thin that it is likely to fail in service. The spacer shown in Fig. 2 is somewhat more substantial, but a better plan is depicted in Fig. 12, which represents a design promulgated by the Hess-Bright Manufacturing Company, involving the use of a specially

shaped spacer, which also serves as a safety bearing, which would come into play were the ball bearings to fail since the spacer is so fashioned that it offers bearing surface for the hub between the inner and outer ball bearings to come down upon.

In connection with the hub, as shown in Fig. 12, the same makers compiled a table affording such information as would seem to be required in the selection of Hess-Bright ball bearings, giving dimensions, and bearings to use when the conditions are normal. This table is here given:

HESS-BRIGHT WHEEL HUBS AND BEARINGS TO USE

| Carrying Capacity of Hub in Pounds | | Axle Diams. Inches | | Bearing Number | | Centers Inches | |
|---|---|---|---|---|---|---|---|
| Pneu. Tires | Solid Tires | Steel Tires | A | B | A | B | C | D |
| 490 | 300 | 240 | .4724 | .9842 | 301 | 305 | 1 | 1 3-4 |
| 620 | 465 | 370 | .6693 | 1.1811 | 303 | 306 | 1 1-8 | 2 1-4 |
| 770 | 550 | 430 | .7874 | 1.3779 | 304 | 307 | 1 5-16 | 2 5-8 |
| 1000 | 750 | 600 | .9842 | 1.5748 | 305 | 308 | 1 7-16 | 2 7-8 |
| 1400 | 1200 | 965 | .7874 | 1.7716 | 404 | 309 | 1 3-4 | 3 1-2 |
| 1650 | 1460 | 1165 | .9842 | 1.9685 | 405 | 310 | 1 15-16 | 3 7-8 |
| 1930 | 1750 | 1400 | 1.1811 | 2.1653 | 406 | 311 | 2 5-16 | 4 5-8 |
| | 2000 | 1600 | 1.3779 | 2.3622 | 407 | 312 | 2 1-2 | 5 |
| | 2330 | 1870 | 1.5748 | 2.5590 | 408 | 313 | 2 5-8 | 5 1-4 |
| | 2750 | 2200 | 1.7716 | 2.7559 | 409 | 314 | 2 7-8 | 5 3-4 |
| | 3350 | 2670 | 1.9685 | 2.9527 | 410 | 315 | 3 | 6 |

**Bearing Selection:** When center distance $C = \frac{D}{2}$:

Mr. Hess points out that the inner bearing must take the larger proportion of the load under the usual conditions, and in selecting bearings his recommendation is to first determine the proper size for the set of bearings and then take the next larger regular

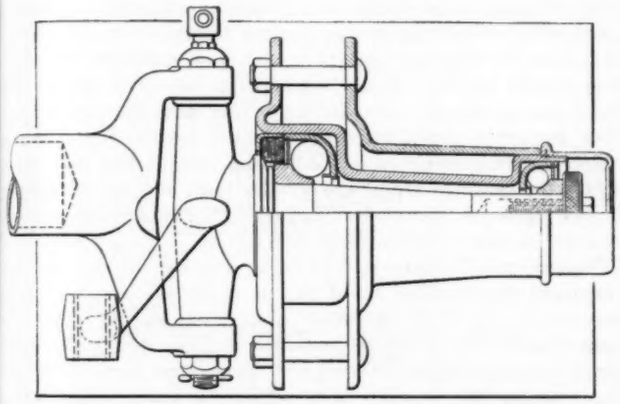


Fig. 6—Front wheel hub wtih cup and cone ball bearings, felt closure, and cap screw replacing a hub nut

size for the inner bearing. Some recommendations are also made, which would seem to be well drawn, as follows:

CONSTRUCTION NOTES

Both inner and outer races of both bearings to be a neat slip fit.
Both inner races to be clamped endwise under pressure.
The inner bearing to take endthrust.
The inner bearing outer race to have 1-64" side clearance.
Front and rear hub caps should be securely locked.
Water and road grit must be kept out.

**Design Depends Upon Tires Used**—Glancing at the table it is to note that the burden which it will be safe to employ in view of a given set of bearings will depend upon the tires; while this is a matter which involves the bearings, even so, if larger bearings are required when tires are solid than would be used with pneumatics, then the hubs must be larger, in order to take the larger bearings. According to the table made up for Hess-Bright bearings, the hub carrying capacity will be as follows:

RELATION OF CARRYING CAPACITY TO TIRES USED

| Carrying Ratio of Tires | | |
|---|---|---|
| Pneumatic | Solid | Steel |
| 100 | 75 | 60 |

The above relations do not assume that the speed of the car will be on a constant basis; obviously, pneumatic tires will allow of the highest speed, solid (rubber) will come next, and steel tires will be at the foot of the speed list.

This question of speed, in view of the tires used, and load carried, was discussed at the 1909 summer meeting of the Society of Automobile Engineers, and in his paper ("Energy Consumption of Commercial Vehicles") Alexander Churchward gave for the most economical speeds, among other data, the following:

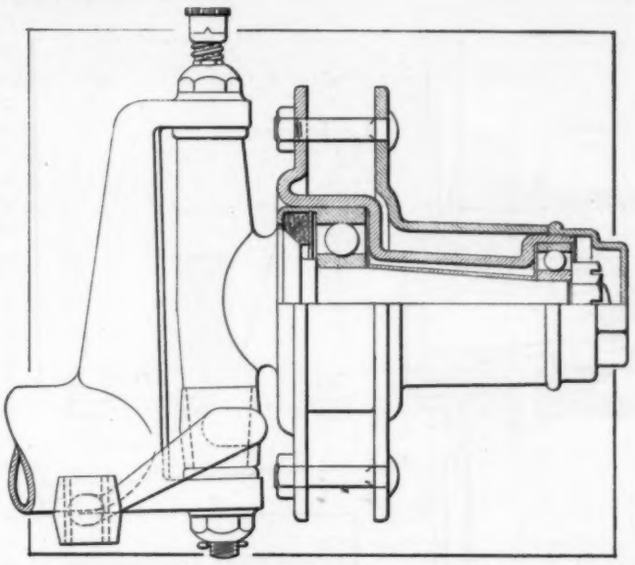


Fig. 7—Drawn steel hub, annular ball bearings, and hollow knuckle swivel pin with grease cup lubrication

ECONOMICAL SPEEDS CONSIDERING TIRES AND LOADING

| Gross Weight | Type of Tires | Speed in M. P. H. |
|---|---|---|
| 1,500 | Pneumatic | 20 |
| 2,000 | " | 20 |
| 3,000 | " | 18 |
| 4,000 | " | 16 |
| 2,000 | Solid | 16 |
| 3,000 | " | 15 |
| 4,000 | " | 13 |
| 5,000 | " | 11 |

The above speeds cannot be construed as limiting, but it was the idea of the author that they represent (all things considered) the maximum from the point of view of economy.

Hubs, while they can scarcely lay claim to an overplus of quality if they are made of cast gray iron, are frequently made of drawn steel, and in this process, light weight, great strength, and relatively low cost, share equally. For examples of drawn steel work reference may be had to Figs. 3, 4, 6 and 7, while Fig. 8 shows a steel casting for the hub proper, with a pressed steel-tubed flange piece. This same figure gives, in cross-section, a brake-drum, and while the subject of brakes is somewhat separated, even so, the rear wheels must be fashioned to take the drums, and to this extent it is desirable to give the matter attention here, from the point of view of fastenings.

The drum, as shown in Fig. 8, is of drawn steel, with uniform thicknesses of walls and machined with considerable accuracy, so that it flanges onto the hub, fitting in the recess provided and in

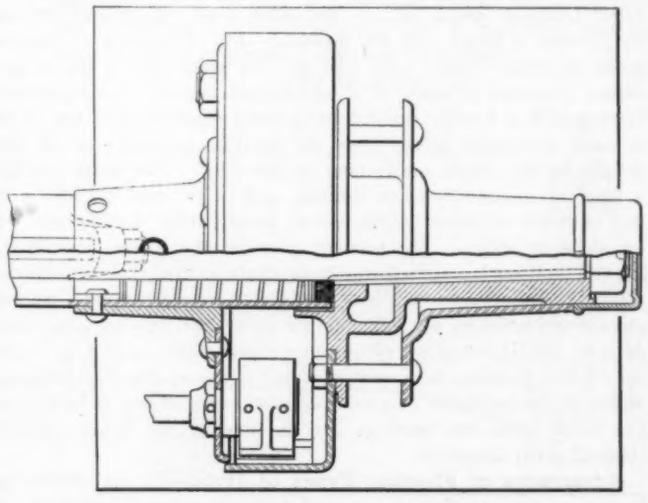


Fig. 8—Hub for live rear axle showing Hyatt roller bearings and felt closure, also close nesting and light weight.

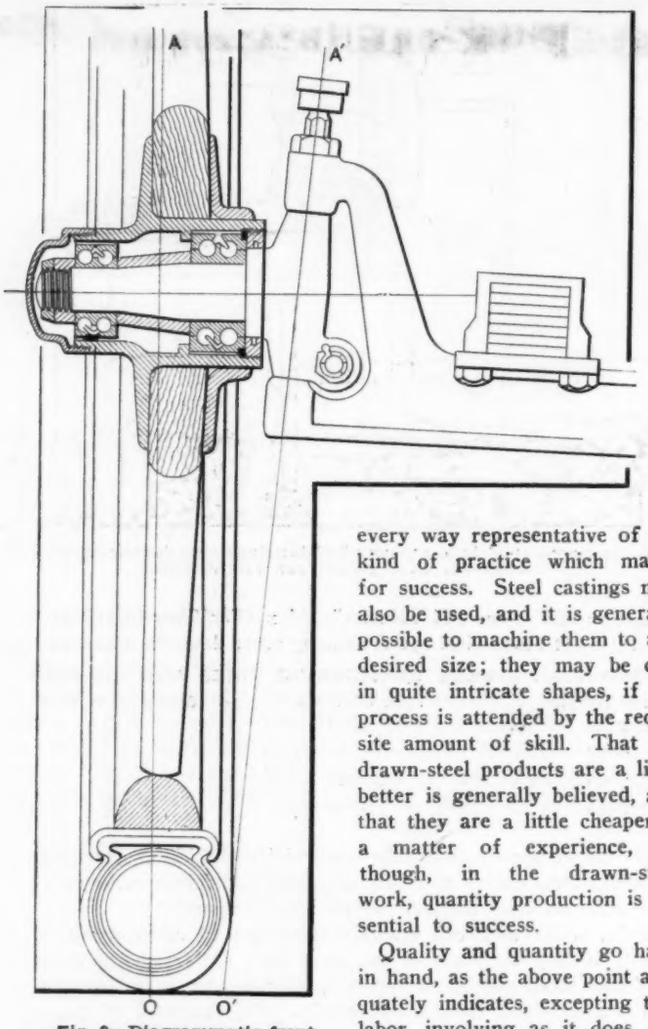



Fig. 9—Diagrammatic front wheel assembly, with New Departure ball bearings, showing the difference O O'

every way representative of the kind of practice which makes for success. Steel castings may also be used, and it is generally possible to machine them to any desired size; they may be cast in quite intricate shapes, if the process is attended by the requisite amount of skill. That the drawn-steel products are a little better is generally believed, and that they are a little cheaper is a matter of experience, although, in the drawn-steel work, quantity production is essential to success.

Quality and quantity go hand in hand, as the above point adequately indicates, excepting that labor, involving as it does, accuracy of machining, must be taken up on a separate basis, although it cannot be shown that production in quantity must, of necessity, lead to inferior work. Workmanship, as a matter of fact, may be good, or bad, independently of quantity production.

**Compactness Largely Influences Designing**—In the class of cars using live rear axles, owing to the ill effect of excess weight, if the parts, as bearings, are relatively great in diameter, housings will have to increase accordingly; designers aim to select bearings which will do the work required without having to provide a large tube or housing. Fig. 8 depicts a case in point, in which Hyatt roller bearings are used, and, as the design shows, economy of space is a conspicuous feature. This particular example is devoid of the floating shaft principle, and the shaft is made somewhat larger since the bending moment, due to the weight on the wheel, must come on the shaft. The shaft may be a taper, or a parallel fit in the hub, and in the case in point the hub is made of extra length, which assures that the key will be of adequate ability. The hub-nut prevents the wheel from floating off, and with a sufficiently large shaft, if the axle is properly rated as to the load it will safely carry, there is no reason why it should not serve its purpose. Hyatt roller bearings are also used in semi and full-floating types of live rear axles as well, so that the style of design is a separate matter, excepting that weight, which is not desirable beyond the exact requirement, is held to a low limit when the bearings are of considerable length, rather than of great diameter.

**Advantages of Floating Types of Hubs**—If the shafts in live rear axles are free to respond to torsional moments only, it is self-evident that they may be smaller for the work, and

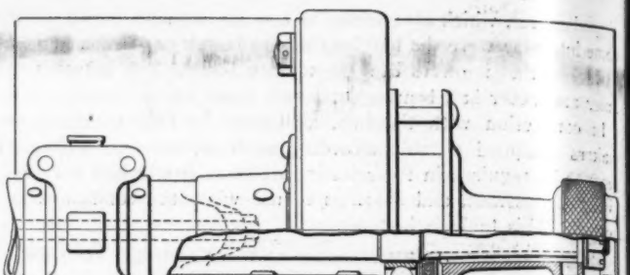


Fig. 10—Hub end of a live rear axle, showing drawn steel brake drum attached to hub flange

strength will reside in them to a marked degree. On the other hand, if the driving jaws, in the hub of the wheel, are not liberally fashioned and nicely fitted lost motion will be present, and a little of this lost motion is as a "nest egg." As an illustration of this point, it is only necessary to call attention to the varied character of the service rendered by keys in practice when they are properly proportioned and tightly fitted they do the work very well, indeed, but if they are not tightly fitted, even though they may be large enough, they will soon generate lost motion and fail in service. What is true of a key or a feather holds for a set of driving jaws, and no matter how they are made, if they are not properly fitted the end will be disastrous. Fig. 14 shows a fine example of a full-floating type of live rear axle in which the bearings are of the annular type, and the driving jaws at the ends of the shafts engage with the hub in a proper manner to abort failure from lost motion.

In this case the tube is reduced in diameter to take the bearings, and the shoulder so formed is taken advantage of in the process of providing for thrust. The shaft has no work to do excepting to take torsional moments, and the design throughout includes drop forgings of steel and drawn-steel parts. The inner races of the ball bearings is a sufficiently heavy tube, but it is not shaped in such a way as to act as a "preventer bearing," hence complete dependence is placed on the ball bearings and they are made large enough to take the responsibility. This class of hub work is much in evidence in various makes of cars, and this particular example is from the 1910 McCue car.

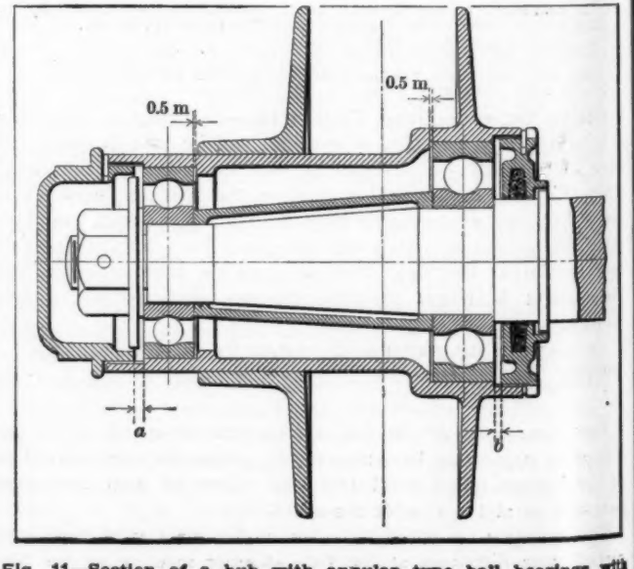



Fig. 11—Section of a hub with annular type ball bearings with inner race clamped and outer race floating

**Hub-Caps Should Be Locked On**—The main idea in using hub-caps is to protect the bearings, which is a matter of the introduction of a suitable lubricant and retaining the same in place to the entire exclusion of the silt of the road. It is too much to expect that a hub-cap, merely because it is screwed on, unless it presses up against a shoulder and is a good fit, will stay on under all conditions. If a locking device of some suitable design is used, there will be small chance of recording the loss of a hub-cap, and while there is no direct hazard attached to the loss, even so, foreign substances are bound to depreciate bearings if they get to them. Fig. 3 shows one of the possible plans, and it has the virtue of being simple and effective. In this case the snap spring rests in a groove provided in the hub, and the inturning end of the lock engages with a hole passing through the hub-cap.

**Closures Indicate Ingenious Application**—One of the duties of hubs is to protect the bearings from rust and foreign substances; acid, which is also ruinous to ball bearings, will most likely come from the oil, and the way to avoid this class of trouble is to use unctuous, non-acid producing lubricant. That the lubricant will stay in is a necessity which will be readily accomplished if it is non-mobile, of adequate body, and if the closures are efficient for the purpose. The front end of a hub is easy enough to protect if a cap is used, and if it is locked on, or at least designed to stay in place until it is removed as a matter of necessity. At the rear of the hubs the situation is not so easy, and piano felt is employed extensively in this work, examples of which will be found in Figs. 1, 2, 3, 4, 6, 7, 8, 10 and 11. If the felt is of a good quality, steeped in boiling paraffine, success will attend its use, provided it is in sufficient presence and well supported. The felt washers to be of the greatest value should be 1-2 inch or more in face and approximately rectangular in section.

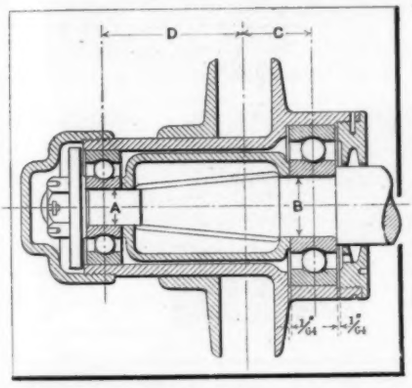



Fig. 12—Hess-Bright type of hub with annular type ball bearings and safety spacer which serves as a preventer bearing

When the closures are formed by V-shaped grooves in collars, as in Figs. 5, 9 and 12, the result will be very good, particularly if the grooves are liberally provided and means are included to drain the lubricant back to the inside. Fig. 13 shows a defective method which cannot possibly protect the bearing, whereas it might be the means of trapping water which could easily find its way into the cavity due to pressure from a hose when the car is being washed. Water indicates destruction.

**Perfection Lies Buried in Details**—Important as the general plan would seem to be, and however much attention may be accorded primary schemes, the end will not be in the plane of harmony unless all the details are looked to with the utmost care. Danger lies in considering that a hub of a wheel, for illustration, is but a crude device at best, and not entitled to the same discriminating care as would have to be accorded to a crankshaft, timer, or other important part.

When the mist of obscurity is lifted, it will be found that success lies absolutely in looking after details. As an example of the strenuous service wheels must render, let the pull, at the radius of the clamping bolts, be investigated, which for a case will be as follows:

When,

W = weight on one wheel in pounds.

f = coefficient of friction for rubber tires = .60 approximately.

R = radius of wheel in feet.

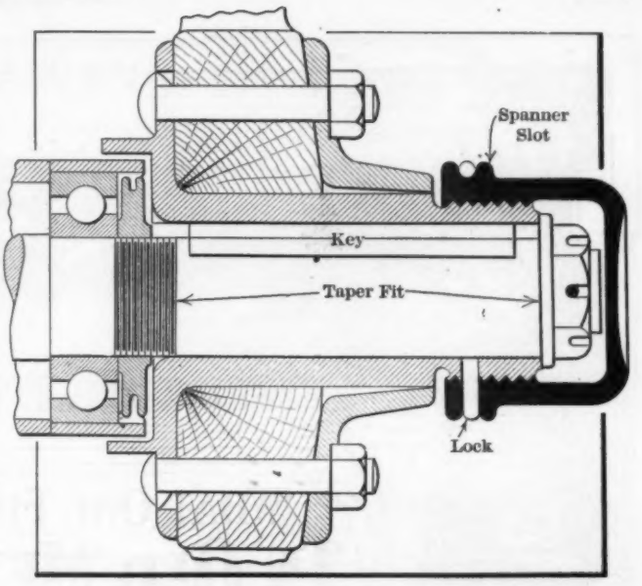



Fig. 13—Section of a hub in which the closure is defective and bending moments apply to the shaft

r = radius of clamping bolt circle in feet.

P = pull in pounds at radius of clamping bolts.

Then,

$$P = \frac{W f R}{r} = \frac{600 \times .60 \times 1.5}{.33} = 1{,}636.36 \text{ pounds.}$$

In which, the weight on the wheel is 600 pounds, and the radius of the clamping (flange) bolts is 0.33 feet or four inches. This will be the effort which will have to be exerted to skid the wheel, presupposing a motor capable of delivering the necessary torque, which is a normal expectation.

If this substantial figure, representing the pull which will come on the hub-flange bolts, under normal road conditions, must be considered, what is to be said about an abnormal case, as when a car is negotiating deep sand, considering a motor of great power, or better yet, if a large flywheel is added, thus rendering the motor capable of delivering a vast twisting moment momentarily?

The real hazard is, as yet, under cover; if the pull on the bolts, as above referred to, is a matter of concern, it is nominal in comparison with the work which will fall on the key, or the driving jaw in the hub, owing to the difference in position, the latter being closer, by a considerable margin, to the axis of moments. If 1,636 pounds will be exerted at a radius of four inches, the pull at one inch radius will be 6,544 pounds, and considering keying, the pull will be even greater since the radius of the center of the key from the axis is less than one inch in most cases. The pressure will still be present.

*(To be continued)*

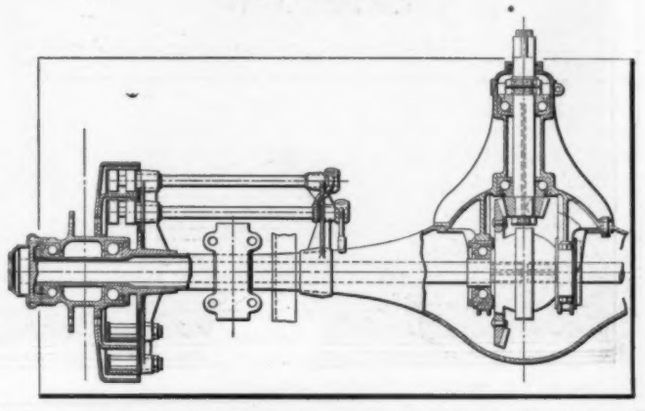


Fig. 14—McCord full floating live rear axle with annular type ball bearings and parts of drop forged steel


WHAT ONE FINDS
IN OLD MEXICO
CAR CHALMERS
PHOTOGRAPHER SPOONER
Among the Cactuses.
Past and Present
Little Mothers
Chimes of Mexico
Spooner on the Water Wagons
Sombreros are Essential
The Men with the Plow.
The National Game
Chihuahua Cathedral

# HELPFUL IN OVERHAULING THE CAR

By Stillman Taylor

ALTHOUGH a car requires and should be regularly given a certain amount of daily, weekly and monthly attention, this overhauling of certain parts is not enough to keep a car in the pink of condition. A thorough overhauling of the entire car is occasionally required, that the needed repairs may be made. It is only by this thorough overhauling that the owner can get a good idea of the car's condition, ascertain what parts show wear, and correct wrong adjustments which may have been previously made.

The principal reason for "knocking down" the engine is to find the exact condition of the pistons and bearings, as well as to clean out thoroughly any carbonized oil that may be found adhering to the cylinder walls. Make it a point to clean each and every part as it is taken apart. This should apply to nuts, bolts and other small parts as well as to the larger parts of the car. Do everything in a methodical manner, taking ample time. Many amateurs are prone to litter up the workroom with the various parts of the car, laying everything down in the most handy place. Avoid this confusion of the parts, by providing a sufficient number of boxes to accommodate the several units of the car, and keep everything pertaining to a certain part in its respective box. As soon as one part is unjointed or uncoupled, insert its pins or screws in their proper place before laying aside. This will prevent any small parts from being misplaced and save annoyance when putting the car together again.

To begin, the carbureter, pump, wiring, spark plugs and any other movable part fastened to the engine should be removed. When removing the magneto, the gear wheels of the engine and the driving pinion of the armature shaft should be marked with a punch at the point where they mesh, if not marked already. By taking this precaution the magneto may be assembled on the car in its proper place without disturbing the original ignition timing of the car. Each valve should be marked as it is taken out, that each may be replaced in its proper seat. It will be convenient to number them 1, 2, 3, etc., by punch mark.

The cylinder castings may now be lifted off the pistons and removed to the work bench. Some workmen prefer to lift cylinders and pistons off together; this is a good plan if a helper is at hand, but more difficult for one man than lifting the cylinder alone. But in assembling without assistance, and especially when the cylinders are cast in pairs or *en bloc*, the weight of the cylinder casting is considerable, and it is much less laborious first to assemble the cylinders with the pistons in their respective places, and so avoid holding up the heavy casting while fitting the cylinders. Then uncouple the connecting-rods from the crankshaft and remove rods and pistons together. Before taking down any other part of the car, it is a good plan to first clean out the cylinders with kerosene to remove any oil and so soften deposits of carbon adhering to their walls. If the deposit is light, this soaking may be all that is necessary, but where a considerable amount of carbon has gathered in the combustion chamber, the walls must be scraped, either with a suitable carbon scraper sold for this purpose, or with a file bent and sharpened to a cutting edge.

All the piston rings should be clean and bright; if any black streaks are found, it is a certain indication of leakage. All worn piston rings should be replaced. Examine the piston pin with a view to possible looseness and wear. It is important that this pin should be a tight fit, otherwise it may work out and injure the cylinder walls. A loose piston-pin may be due to the set-screw becoming loose, or it may be caused by wear. In the latter event, the pin should be replaced with a new one of the proper diameter and length. Thoroughly clean the piston, rings and pins with gasoline.

**How the Valves Should Be Ground**—The valves should be next attended to, as the chances are they need grinding. This is not a difficult task, and if the directions are followed the amateur should be able to turn out quite as good a job as the garage. Procure emery of the grade known as 120, put a small quantity in a saucer, and add kerosene (gasoline should not be used, as it evaporates too rapidly) to make a thin liquid paste. Then add a few drops of heavy lubricating oil to give the mixture a little more body. Put a small amount of the grinding mixture on the face of the valve and its seat, insert a screwdriver in the valve slot and rotate in its seat. This is easiest done by rolling the handle of the screwdriver between the palms of the hands, first one way, then the other. Do not use a greater force than is necessary to turn the valve in its seat. Lift the valve up occasionally, turn it partly around in its seat and rotate as before until the valve and its seat show a bright ring the entire way around. Renew the grinding mixture occasionally, but remember that a small quantity of emery and plenty of kerosene and oil will not only make a smoother job, but will also do it much more quickly than a large amount. Finally, the valves and their seats should be washed with gasoline to remove every particle of the grinding mixture.

The camshafts in most cars are removed by taking off the cover of the case which encloses the timing gears and pulling the camshafts through this opening. All modern cars have the crankshaft gear marked, and another mark between the two teeth of the timing gear on the camshaft. When assembling, the single marked tooth should be inserted between the two teeth as designated. Breakage or undue wear of the cams is a matter which only the factory experts can handle.

Cleaning the radiator of grease or any scale that may have accumulated is best done after the car is reassembled and in running order. The writer's method is to dissolve one-half pound of lye in a bucket of water, stirring until dissolved. This should be strained and the radiator filled with the mixture. Run the engine for five minutes and allow to stand for a quarter of an hour, then drain off the mixture and fill up with clean water; run the engine for a couple of minutes and drain off again. Three or four rinsings should be given to remove all the alkali.

The gear-box cover should now be removed and the gears examined. As most transmission systems are fitted with annular ball bearings, only a good cleaning to remove old grease will be required. In case any gears are badly worn and their edges chipped, they should be replaced with new ones.

The clutch may next be taken down. The exact mode of procedure differs in different car clutches. In most cars using clutches of the multiple-disc type it may be removed as a unit; in other forms, the shaft connecting the shifting sleeve may be uncoupled, which gives sufficient room between clutch and gear box to take the cluch apart. If the latter is of the cone type, it may be found that the leather face is badly worn and that a new leather is necessary. This is not a very difficult job, but requires painstaking work.

**Replacing the Leather of a Cone Clutch**—Remove the old leather by cutting off the rivets on the underside and driving the rivets through to the outside. Keep the old leather and use it as a pattern by which to cut the new piece. It will be much better, however, to purchase from the factory a new leather of the proper width and thickness. As a new leather will have considerable "give," it must be stretched tightly over the cone. First cut one end of the leather square and fasten it to the cone with two rivets. The other end should not be cut at this stage of the work, but brought around to

meet the fastened end, and, after tightly stretching it over the small end of the cone, fasten it with a single rivet. Then force the leather up onto the cone, drill out and countersink the holes and rivet up securely. The only knack in the operation is to keep the leather tight that it may be a snug fit on the cone. A loose leather will, naturally, be a dead failure. After the leather has been forced into its place the uncut end should be trimmed to make a good joint. Any unevenness may be trued up with a file. The new leather will readily absorb several applications of castor oil before it becomes smooth and pliable.

Care should be taken that the rivet heads are countersunk below the surface of the leather. In case they work flush, owing to the wearing down of the leather face, they should be re-riveted. The "biting" or jerky action of a cone clutch may often be traced to the rivets working out, and this will frequently prevent the clutch from being readily disengaged. Re-riveting will prove an effective remedy in this case, and considerable additional service may be had from the leather before it wears down to the rivet heads.

The differential gear should be tested with a view to locating any wear or side play. This may be done by jacking up the rear axle and shaking one wheel forward and backward while the other is held stationary, and noting how far the wheel must be turned before the movement is taken up by the flywheel of the engine. Any noticeable play will generally be found either in the center pinions or studs of the differential gear, in the large and small bevel gears, in the clutch sleeve, or in the universal joints. The differential gear and live axle of modern cars seldom give trouble if kept properly lubricated, and the car's mileage should run up into many thousands before any considerable amount of play is evident. The joint pins of the propeller shaft may become loose through wear, in which case a knocking noise in the transmission gear will indicate the cause and location of the trouble. These pins may be readily replaced with new ones at small cost. If the play is found in the bevel gears, the small gear should be adjusted to mesh deeper with its larger mate. This may be done by means of the adjustable locking ring or by inserting a washer of the proper thickness. It may be found, however, that no adjustment is necessary, and a thorough cleaning with gasoline to remove all oil and grease will be all that is required. The case should then be refilled with the quantity of oil and grease recommended by the manufacturers.

Oil pipes or "leads" which conduct the oil to the bearings should be removed and all old oil washed out by forcing gasoline through them. Care should be taken that the passages of all oil leads are clear and unobstructed. The oil pump should be taken apart and given a thorough cleaning with gasoline. The sight feed lubricator on the dash should also be cleaned out and the glasses wiped and washed out with gasoline.

**Look at the Steering Gear and Brakes**—The steering gear is a very important part of the car, and, as the safety of the occupants may be endangered by any binding, the reader should give it even more careful attention than the other parts. The gear should be taken down, given a thorough cleaning and examined for possible wear. In case the steering action is stiff and the wheel turns hard, the ball joint may be out of adjustment due to wear; the steering link may be bent, or the cause may be insufficient lubrication. If there is any considerable amount of backlash, the cause may be looked for in the joints of the levers, in the swivel pin, in loose bearings, or in wear of the worm and sector. Another common cause of backlash is often found in the wheels, which work out of alignment. It is essential that all moving parts of the steering gear be well lubricated.

The distance rod is easily bent, which throws the front wheels out of line. This is a common cause of "side slip" and rapidly wears out the tread of the tire. The bent rod should be uncoupled and carefully straightened. On many cars, however, the rod is designed to be bent, in order to clear other parts.

Each wheel should be removed and examined at the hub to see if the spokes have become loosened through shrinkage. Although this is not a common fault, it is, nevertheless, worth looking for. If slightly loose, tighten up the bolts which secure the two side flanges together, clean out bearings with gasoline and renew any ball or roller which is found damaged. If rust has accumulated, scrape or sandpaper it off (a painter's wire brush is a handy tool), and when perfectly clean coat the rim with beeswax. This may be applied with a clean paint brush if the wax is heated to a liquid state. This will effectually prevent further rusting of the metal, and will do much to preserve the life of the tires.

Examine the brakes to ascertain if the lining is in good condition. If worn, the old lining should be replaced with new. If the brakes are of the internal-expanding type, the shoes may have become worn, in which case they should be renewed. Toggle joints and adjusting nuts should be inspected and any looseness taken up. Brakes should be adjusted on the road, as any improper adjustment of the equalizer bar will have a strong tendency to make the car skid. Both brakes should be adjusted alike, that the braking force applied by the equalizer may be transmitted to the wheels equally.

The tires should be cleaned of the old chalk on the inside of the shoe. If they are badly worn on the treads, but otherwise in good shape, send them to the factory to be retreaded. A tire should never be kept on the car after the rubber tread wears down so as to expose the fabric. Any small cuts and holes should be washed out and filled with rubber solution.

Inner tubes should be tested for leaky valves and patches attended to at once. The old casings and tubes may be made to give considerable additional mileage by using them on the front wheels, where the strain is not so severe.

**Caring for the Electrical Apparatus**—Look over the electrical plant and replace worn wires with new. Clean out the timer with gasoline and lubricate with light oil. The magneto need not be taken apart, as it will probably only need a little surface cleaning, a few drops of oil, and the amateur had better not meddle with its internal mechanism. The storage battery should be examined, and if the brown deposit collects in any quantity at the bottom, the electrolyte should be poured out into a glass bottle and the battery washed out with clear water (rain water preferred). Clean the top of the battery and make it a point to keep it clean and free from acid. Clean the terminals of any corrosion and see that the air vents are not clogged up. If the accumulator has been neglected, either in the electrolyte having been allowed to get below the proper level or in not giving it the regular monthly "charge," it may get a bad case of sulphating.

To get the battery into its normal condition, empty out the electrolyte and wash the case thoroughly with soft water. Pour in only about seven-eighths of the acid solution and fill up with distilled water to cover the top of the plates. The battery should then be charged with a low current until the plates are restored to their normal condition. If very badly sulphated, the white coating should be washed off with a rag, and in case this fails to remove it, scraping must be resorted to. If the electrolyte is not sufficient to cover the top of the plates, fill up with distilled water so that the liquid will just cover them. The specific gravity of the electrolyte should not be less than 1.150, and, although varying somewhat, a hydrometer reading of 1.250 is recommended. This is approximately 1 part of sulphuric acid to 4 1-2 parts of water, which will be found sufficiently accurate if no hydrometer is at hand. If the electrolyte should test lower than the first figure, add pure sulphuric until the 1.250 mark is reached.

In case the plates are broken down or "buckled," or if the paste has dropped out of the pockets in the grids, the accumulator should be sent to the manufacturers for repair. In some accumulators the liquid is not used, but a jelly made of silicate of sodium and dilute sulphuric acid takes its place. If your battery is of this type, it is well to remember that the jelly must be kept moist on the top, and as the emulsion becomes dry a

little water should be added to replace that which is lost through evaporation.

The contact points of the coil will probably require adjusting. This is very easily accomplished by trimming up the points with emery paper. Do not rub away the metal unnecessarily, only removing enough to true the points so that they make a good contact. In adjusting the vibrator, remember that a light tension is much better than a stiff tension. A light flexible vibration with a moderately high-pitched buzzing note will not only give a better spark, but will keep the points in better shape. A heavy tension will make the coil less responsive and will pit the contact points and exhaust the battery more quickly. As a coil will render the most efficient service only when the vibrators are adjusted as nearly alike as possible, a special ammeter is often used to determine the current consumption of each unit. The ammeter should show a reading of 6-10 amperes.

**Assembling Often the Most Difficult**—In assembling the car the engine had best be put together first. When putting the pistons in their respective cylinders see that the splits or joints in the piston rings are not in line, but are spaced evenly around the piston. See that all parts are thoroughly clean and that no grit or stray strands of waste happen to be caught on any projection. All nuts and bolts should be screwed tight and the jaws of the wrench should be properly adjusted to them, that the corners of the nuts and cap screws may not be rounded off. Insert the cotter pin after each nut has been screwed home. In joints where packing is required the old packing may be used if it is in good shape. Joint faces should, of course, be perfectly clean. A stout grade of manila wrapping paper soaked in linseed oil will make an excellent packing for crankcase and other joints having a good contact surface.

While the engine is being reassembled it will be found advantageous to check up the valve timing. To do this, turn the fly-wheel until the inlet valve plunger of No. 1 cylinder just touches the lower end of its valve stem. At this point the line on the fly-wheel indicating "Inlet No. 1 Open" should coincide with the pointer on the engine base. If the contact between the valve stem and the plunger is made before the mark on the fly-wheel lines up with the pointer, the valve opens too early. In most cars the adjustments may be made by the screw cap and lock-nut on the plunger. As the valve stems are lowered by repeated grindings of the valves, the plungers require adjustment occasionally to compensate for this movement. Insert a piece of paper between plunger and valve stem, and by lightly pulling on the paper the time of contact and the moment of release may be determined to a nicety. When the paper is held tightly, a good contact is assured, and the moment the paper becomes loose and can be moved about, the contact is broken. In many cars the reference or index mark on the engine bed is omitted; in this case the markings on the fly-wheel must be brought directly to the top. The other inlets and the exhaust valves should then be similarly checked up and adjusted.

Most cars base the valve setting on a 1-32-inch clearance space between valve stem and plunger rod when the valve is closed. This may be taken as the minimum amount, and should not be increased. A larger amount of clearance will cause the exhaust valve to open too late, and, the exploded gases not being entirely expelled, the power of the motor will be impaired. This clearance is necessary to allow for the expansion of the valve stem when it becomes heated.

Too much stress cannot be laid on the necessity of going about the work in an orderly and methodical manner. A mechanic who leaves parts lying about carelessly will rarely be found a good one, and certainly he is not a proper model for the amateur to copy. With the proper circumspection, then, and with a little "horse sense" in applying the directions to his particular make of car, the amateur owner should have no difficulty in making a good job of overhauling, thus bettering the condition of his machine and at the same time acquiring a valuable stock of knowledge for the future.

## SOME INFORMATION FOR THE MAN WHO DRIVES

**Examine the Car Below the Frame**—Most autoists are content to make all their inspection of the car and its mechanism from above, and rarely give more than a casual glance below the frame except when trouble occurs. On cars fitted wtih pressure-feed on the gasoline, the piping should be frequently inspected, on account of the danger from fuel leakage. Such inspections should be made when the motor is stopped and the pressure still turned on. The tank should be gone over for leaks arising through the opening of its seams from vibration, or the loosening of the union connecting the fuel lead with the tank. The lead and its connection to the carbureter should also be examined for leaks and abrasions due to rubbing against other parts of the mechanism. If any such are found they should be immediately repaired. Twine, tire tape or rubber bands will act satisfactorily as fenders to prevent further mischief. Unions which can not be made tight by screwing up should be taken apart and the male connections coated with soap or red lead, which will render them tight for a considerable time.

After going over the fuel system, the brake rods and steering connections should be examined for loose joints and broken oil and grease cups. Grease boots on the drive-shaft joints should be seen to be sound and filled wtih grease. A cleaning out of the dirt from the interior of the mud-pan will often reveal lost cotter pins or nuts and tend to a more agreeable handling of the draincocks, carbureter and filter. This time will be well spent when the chances of fire or accidents arising from faulty steering or brake connections are taken into account

**When the Jack Is Missing**—Should the jack be missing or broken, an efficient substitute can be rigged from a large stone or a number of bricks piled one on another until the height is sufficient to life the wheel from the ground. Having gotten the stone or piled the bricks one of the floor-boards can be utilized as an inclined plane and the car backed up until the axle rests on the top of the pile. When the work has been performed, the axle will have to be pushed off the pile, but as the drop is inconsiderable no harm can come to the tire. Where stake-and-rider fences abound, one of the rider timbers can be utilized as a lever with a stone as a fulcrum to raise the axle, supporting the latter with another stone during the repair and gently easing down the axle when ready to proceed.

**Where the Owner Himself Takes Care of the Car**—Beautifully polished brass and nickel work look smart on any car, but it requires considerable attention to have the work always in ship-shape condition. With the autoist who has a chauffeur or garages his car no thought need be given to the matter, but he who does all the work on his car has, as a rule, little time to spare on polishing and so his bright-work belies its name. Autoists, therefore, who purchase a car will find that it will pay them to have all nickeled or brassed parts given a coat of man-of-war gray or oxidized-bronze finish so that only at long intervals will it be necessary to give the parts more than an occasional wipe. The time and labor thus saved will be well worth the money spent.

**Benefits of Night-Driving**—Driving at night is beneficial in a number of ways. A drive at night after the day's work clears the mind and fills the lungs with fresh air. The rapid passage of the car creates a sense of buoyancy and the reaction causes a feeling of drowsiness which makes the autoist sleep like the proverbial top. Especially is this the case with nervous persons or those whose occupation keeps them indoors for the greater portion of the day. This applies to driving in the spring, summer or autumn, as winter driving at night in an open car is far from pleasant, and may subject the riders to neuralgia.


## TWO CYCLE POWER OUTPUT

Editor THE AUTOMOBILE:

[1,995]—Referring to your answers to questions number 1,986, page 316, August 19th issue, comparing two and four-cycle motors, your statement that "The very best two-cycle engines will not develop much over one-fifth more power than the same sized four-cycle," does not do justice to the perfected type of two-cycle motor. For example, take a two-cylinder, four-cycle motor of 4 1-2-inch bore and stroke, and the power limit is about 12 horsepower. For comparison, take the Atlas, two-cycle motor, with which I am well acquainted, and the two-cylinder engine of 4 1-2-inch bore and stroke shows 22 horsepower, and the comparison holds good in the three and four-cylinder types, actually showing at least 60 per cent more power than the best four-cycle motor of equal dimensions.

A little investigation will show you other good two-cycle motors that can easily disprove your statement as to power. Your comparison for the greater part was unbiased and very clear. My taking exception to your last lines is due to the fact that most of the prejudice against the two-cycle motor has been due to ignorance of actual facts and of the increased efficiency of the present-day motors, and misstatements of any nature, in a widely read paper such as "The Automobile" should be revised, at least when involving important interests.

THOMAS E. DENTON.

Newark, N. J.

Replying to the above criticism, attention is called to the description of the Thomas cars in the same issue as mentioned, page 319. In this is given a chart of the actual power of a 4 1-2-inch diameter engine as plotted from accurate tests. This shows that the power which can be developed from six cylinders of that size may easily reach 64.2 horsepower. Now, the A. L. A. M. rating formula gives this sized engine a power output of but 48.6. So, the actual engine exceeded the rating formula by 32.1 per cent. Since this is not an unusual motor, it is fair to assume that any other of the same general dimensions would do equally well. So, taking the A. L. A. M. rating for a two-cylinder, four-cycle engine of 4 1-2-inch bore from a table, it is found to be 16.2 horsepower. Now, adding to this the increase of 32.1 per cent, which it is possible to obtain, the result obtained is 22.4. As compared with the power which you say can be obtained from a two-cylinder, two-cycle engine of this same size, there is a slight increase in favor of the four cycle of 1.8 per cent instead of the one-fifth or 20 per cent the other way which we generously allowed.

If it is a fact that more power can be obtained from the two-cycle engine of any given size, why is it that none of the two-cycle people ever give out accurate and bona fide test results like the one spoken of above, instead of contenting themselves with claims as to wonderful power output. The writer is very much interested in this subject and has searched long and faithfully for data to prove what the two-cycle power output really was. After three years searching, it must be confessed that the only information came to light very recently and that was from England and concerned a radically different construction of two-cycle engine, which could not well be compared with the ordinary four-cycle engines.

A power curve of this English two-cycle motor, two of them in fact, as compared with an equally well-built English, four-cycle engine of similar size, showed up as follows: Both two-cylinder, two-cycle engines developed the same maximum power, which was 13 1-2 horsepower at 950 revolutions, with a rapidly falling torque curve, the greatest power being taken at the speed mentioned, higher speed giving less power. Now, the four cylinder, four cycle, which ought to be halved as a source of comparison, gave on the testing stand (the same in each case) 30 1-2 horsepower. This was on a constantly rising torque curve, which showed or appeared to show, that much more power would be developed at still higher speeds. So, taking half of this modest four-cycle output for comparative purposes, we get 15.25 as compared with 13.5 for the two cycle. This, you see, is 13 per cent in favor of the four cycle rather than 20 per cent for the two cycle.

While not desiring to start a controversy on this subject, the writer would say that this lack of data, combined with the results from what little information is available, has led him, personally, to think that the two cycle will not give as much power as a four cycle of equal size, number of cylinders, and similar construction. In this, he is like the man from Missouri, willing to be shown.

## VERY ELUSIVE MISSING

Editor THE AUTOMOBILE:

[1,996]—I am taking care of a * * * * * * * touring car, the engine of which, when it runs under heavy load or at high speed, disengaged from the car, will run perfectly; but when running at low speed and idle, will run almost entirely on one cylinder. The car has a * * * * * * * * coil and shows a very good spark on both terminals when pulled off from the spark plug. The spark plugs are in good condition, and the compression is good. I have adjusted the carbureter in different ways and the miss cannot be stopped. Now will you advise me through "Letters Interesting and Instructive" where the trouble may be. S. S.

New Ulm, Minn.

The trouble is in the wiring. You have one of these faults: loose wire or connection; broken-down insulation, or broken wire. The first being the case, the wire is shaken out of a connection or circuit by the running and consequent jarring of the engine when under load, which is not the case when turning over quietly without load. This applies equally well to the third case or broken wire, which holds together, perhaps through the strength of the insulation, when running slowly and quietly.

The broken-down insulation only shows itself when the spark is required to jump a large gap through compressed gas, as in the cylinder, whereas it will not show on a small gap outside of the cylinder. The remedy is to renew the wiring.

## ELECTRICS' POPULARITY

Editor THE AUTOMOBILE:

[1,997]—Without wishing to be too critical of your editorial in the July 15 number, permit me to correct the apparent erroneous impression that the revival in the use of electrics has been "of late." The increase has been a continuous one for a number of years, though many have not realized that any change was taking place.

As to leading electric vehicle manufacturers into the "promised land," apparently the writer of your editorial is not familiar with the past history and the effect that the premature announcement of the Edison battery had on trade in 1903 and 1904 and various occasions afterward.

We are all anxious that Mr. Edison should do what he has himself expected, though few have any hopes of such accomplishment as the press heralded. Indeed, it has been said that Mr. Edison never authorized the exaggerated claims which have been made.

The Edison, or any other battery which is better than that which we now have, will be welcomed, but if any manufacturers are waiting "with bated breath" it is probably in wonderment as to how many new editorial writers will take occasion to dilate on the possibilities which offer such opportunities for imagination.

Probably very few manufacturers will again invest much capital in special models to take the Edison battery until the scrap castings and patterns from former models built for that purpose and charged to profit and loss are forgotten.

And as to the hose-pipe tire, your reference is misleading. Except for the very low voltage, light car of the Baker, no one has, except for occasional test or experiment, used a thin wall hose-pipe tire for years. All of the so-called electric tires are made in detachable form and have been for a number of years. They can hardly be called thin walled, but are rather flexible walled and made of finer fabric and more pure rubber than the gasoline type of tire. When properly made they seem to have just as great durability. HERBERT H. RICE,

THE WAVERLEY COMPANY.

Indianapolis, Ind.

## WHY NOT USE BROKEN CHAIN

Editor THE AUTOMOBILE:

[1,998]—In the issue of Aug. 19 of your paper and on page 315, under the heading "Chain or Shaft," the following statement occurs: "If one of the chains break, on a double chain driven car, it is helpless, and must be towed home."

I don't see it. Why not use the broken chain, a piece of wire, or a bit of rope to fasten the sprocket on the end of the counter shaft on the side of the broken chain to the frame of the car and drive home with the other wheel? It has been done and so can be done again.

Fredonia, N. Y. A. WILSON DODS.

The above wayside repair is not only a good and practical one but will save the owner of a chain-driven car, in a similar fix, from the annoyance of being towed home. The idea is to fasten the countershaft on the broken chain side so that it cannot rotate. In this case, through the action of the differential, the engine will drive the other shaft in the regular manner. It will thus be possible to proceed home but at a reduced speed. As blocking one shaft of the differential in this way will cause the other shaft to rotate at twice its usual speed, it will be necessary to use the low gear, and difficulty may be met on hills.

# ANSWERED AND DISCUSSED

## LONG STROKES DISCUSSED

Editor THE AUTOMOBILE:

[1,999]—I have for years stood for a short stroke engine in order to gain the light weight and compactness needed in auto work, and I regard the use of long strokes as a mistake for daily use. For the racing service for which they were designed I have nothing to say. I feel that your answer to Mr. Hickman (1,949) is not full enough to make clear the facts. The long stroke engine cannot make so many turns per minute as can the short, because the limiting thing is the piston speed. Thus a 4-inch stroke can turn its shaft 50 per cent faster than a 6-inch stroke engine and not exceed the same piston speed. This means that the short engine is 50 per cent more flexible. Your statement that less reducing gearing is necessary is hardly correct. With a flexible engine there is less need for speed changes than with an engine which is incapable of making those changes by throttle. But the racing car has little need for speed changes. It is not subjected to deep mud, thick traffic, steep hills and such things as make necessary the use of low gears on a car for daily use. It therefore is not at a disadvantage if it has a less flexible engine, but, on the contrary, gains if its engine of a given size can be made to work more efficiently. But what is best for the racing man is not of necessity best for the road user. I saw comfortable road bicycles converted into comfortless racing things and then the public, disgusted, gave up the style of using the cycle. Racing rules should limit power by limiting piston displacement and let the designer make the engine the way he thinks it ought to be. This developing an industry by laws made by people who know little or nothing of the subject can never be productive of best mechanical results.

CHARLES E. DURYEA.

Reading, Pa.

Since long-stroke motors may be made to turn over as slow as 250 revolutions per minute, which is as slow as it is ever necessary to run the engine, and engines of a stroke equal to twice the bore have actually turned over as high as 1,800, it seems as if the claim of lack of flexibility is not well founded. The Arrol-Johnston 4-inch engine developed its best power from 1,500 revolutions on up to 2,400 revolutions, at which latter number of turns, the power output was in excess of 72, as compared with the rating for this engine (a four cylinder, four cycle) of 25.6 horsepower.

It seems as if this denoted superior rather than inferior flexibility, and sufficient power to entirely eliminate the gear box, which is going "less reducing gearing" one better. At ordinary speeds, this motor will develop more power than an ordinary short or equal stroke engine, so that for the same power requirement it may be run slower. In emergency cases, when a lot of power is suddenly required, instead of gearing up as in the short-stroke motor, the throttle is opened, and advantage taken of the superior power ability of the longer stroke. In this respect it is somewhat similar to the steamer, which is able to develop an enormous amount of power for a short time, with this essential difference in favor of the internal combustion engine that it can keep on developing the extra power for an unlimited length of time.

If an average power requirement be taken, it will be found that the long-stroke unit develops it, or meets the requirement, with a smaller rotative speed. This means that the gear reduction at the rear axle may be less whatever the speed may be. This lesser reduction at the rear axle means that the driving bevel may be larger and consequently stronger, or on the other hand, the driven bevel may be smaller without reducing its strength, since it is already very large. The size of this governs the road clearance which may, by this latter method, be materially increased. Similarly, this reduction of size of the driving gears reduces the size, weight, and cost of the bevel gear and differential housing. In this way, the whole rear construction is reduced in size, cost, and weight.

It is the firm belief of the writer that the engines of the future will be of very small bore, taking up very little space. In place of the present sizes, a long stroke and superior construction will be relied upon to give a very much higher power output than we now obtain. As to the linear piston speed, if that is satisfactorily taken care of in racing cars, in which the very highest speed is maintained for upwards of ten hours, there is no doubt that touring cars will be well cared for.

The gain from these smaller bore but longer stroke engines of the future will be threefold; lessened space, devoted to the power unit; greatly reduced weight, despite longer stroke, and as a factor of the other two, lowered cost. The light weight of both engine itself, and rear consctruction, as previously pointed out, will evolve more mileage from the tires, and other similar parts, resulting in making the upkeep less.

This tendency towards the small engine with long stroke is noticeable in a mention of a few of the latest productions of the other side. Thus, taking those most handy we find: the new Mercedes (German) with a four-cylinder engine of 80 mm bore (3 1-8 inch) by 130 mm (5 1-8 inch) stroke. Delaunay-Belleville (French) has just brought out a new little car equipped with a four cylinder 85 mm (3 3-8 inch) bore by 120 mm (4 3-4 inch) stroke. So, too, in England, the latest Sunbeam car has an engine of 95 mm (3 3-4 inch) bore by 135 mm (5 5-16 inch) stroke. This latter would rate at 22.5 and actually developed on test 54 on a continually rising torque curve. Doubtless, the sales record of this car would show how many motors of 5 by 5 and larger sizes were put out of business altogether by the newer and smaller car, with the more powerful long stroke (1 to 1.42 ratio).

## COMPRESSION—EXPLOSIONS

Editor THE AUTOMOBILE:

[2,000]—Will you please answer the following through "Letters Interesting and Instructive":

1. About what pressure is exerted per square inch in a gasoline engine cylinder when the charge is exploded?

2. What effect would it have upon a four-cycle engine if the charge were to be exploded just before the completion of the compression stroke (of course sparking of the ignition would be a little earlier than the explosion)?

A. F. C.

Fitzwilliam, N. H.

In answer to your first question, this quantity varies from 50 up to about 75 pounds per square inch for the compression pressure, which is multiplied by four (roughly) by the explosion. That is, the explosion pressure varies from 200 up to 300 pounds per square inch. These figures are for normal engines intended for ordinary touring purposes, and do not take into account the cars especially built for racing and similar purposes in which the compression pressure may go as high as 100 pounds per square inch, and the explosion pressure to more than 400 pounds.

Your second question describes average and daily automobile practice, if you but knew it. That is, in engines now used, the spark is made to jump a measurable amount before the engine reaches the upper dead center, or as you put it, before the compression stroke is completed. The lag in the propogation of the flame through the mixture, with the consequent lag in the expansion of the exploded gases, is so great that at the speed of the motor, the expansion does not begin to drive the piston down until it has passed the center. This action only occurs at high speeds, when the rotative speed of the engine enters into the question, with a favorable action. At slow speeds, the spark is made to happen at points further and further ahead on the stroke, until the extreme point is reached at the starting position. This last is usually fixed at 15 degrees of the crankshaft after the upper center.

From this point, the angle gradually decreases with increasing speed, until it reaches and passes the center point. Beyond this, in many cars, it may continue up to 20 or more degrees past the center. In point of fact, a number of prominent and successful French designers exceed this very much, as will be noted by the short table appended. In this the rotative speed (maximum) is given and the angle is that of farthest advance before center measured on the crankshaft:

| | | |
|---|---|---|
| Rochet-Schneider | 20 degrees | 1,400 |
| Aries | 20 " | 1,500 |
| Darracq | 21 " | 1,500 |
| Vinot-Deguignand | 27 " | 1,500 |
| Brouhot | 30 " | 1,300 |
| De Dion | 30 " | 1,400 |
| Unic | 30 " | 1,650 |
| Peugeot (Beaulieu) | 31 " | 1,400 |
| Sultan | 32 " | 1,600 |
| Renault | 33 deg. 30 min. | 1,600 |
| Brasier | 34 degrees | 1,350 |
| Cottin-Desgouttes | 38 " | 1,300 |
| Peugeot (Paris) | 38 " | 1,300 |
| Cornilleau-St. Beuve | 43 " | 1,300 |

These are arranged in order of advancing spark advance, and it will at once be noticed that the speeds of rotation do not follow in a natural increasing order.

## AERONAUTIC EXPLANATION

Editor THE AUTOMOBILE:

[2,001]—I have been considerably puzzled by some of the aeronautical terms that seem to be coming into general use. For instance, Bleriot's machine is called a monoplane, which one would naturally suppose to mean that it had one plane or supporting surface, but a description of this same machine says that it has two wings. I am unable to reconcile these statements with any degree of satisfaction to myself. I am also unable to see what improvement the Wrights have made in aeroplane construction. The pictures I have seen of their machines do not look any different from the others, except that they do not have any wheels. Can you explain what their patents are based on? Perhaps some day the different types of airships will be as familiar as shaft-drive and chain-drive, but meanwhile there may be many of your readers who are in my predicament. I am sure that an explanation of these details will be of general interest. OLD-TIMER.

New York City.

The sudden leap into prominence of the different sorts of flying machines has certainly introduced an abundance of new technical terms into the language, and we are of your opinion that these may be confusing to a great many who are really interested in this subject and would like to keep abreast of the times in it. We already have in course of preparation an article which will treat this subject thoroughly, to appear in a near issue of THE AUTOMOBILE. Meanwhile we shall be glad to go into the subject at some length.

The basic distinction in all flying machines is between lighter-than-air and heavier-than-air types. The former rise by the direct action of gravity until they reach a level where their weight equals the weight of the volume of air they displace. The latter rise by the action of the pressure of the air beneath their rapidly moving surfaces.

The lighter-than-air class includes all balloons, as well as the vacuum airships sometimes proposed. Dirigible balloons, which are those popularly called airships, have been made familiar by Zeppelin in Germany and by Knabenshue, Baldwin and others in this country.

Of the heavier-than-air class, the original form is simply the kite. The only difference between a kite and an aeroplane, except for size, is that the kite is usually held stationary in a current of air, while the aeroplane moves itself and provides its own air currents. The supporting surfaces of the aeroplane, corresponding to the body of a kite, are usually called planes, though they are in reality curved. The terms monoplane and biplane may best be explained, however, by taking plane in its other meaning of "level"; thus a monoplane has its supporting surfaces in one plane or level, and a biplane in two planes.

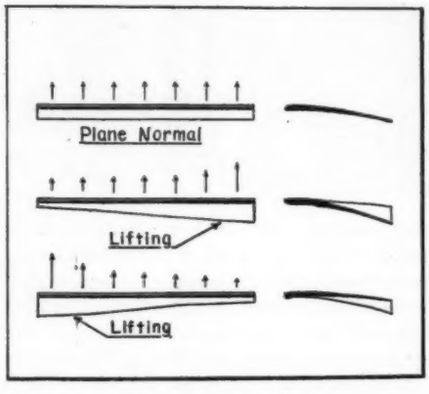


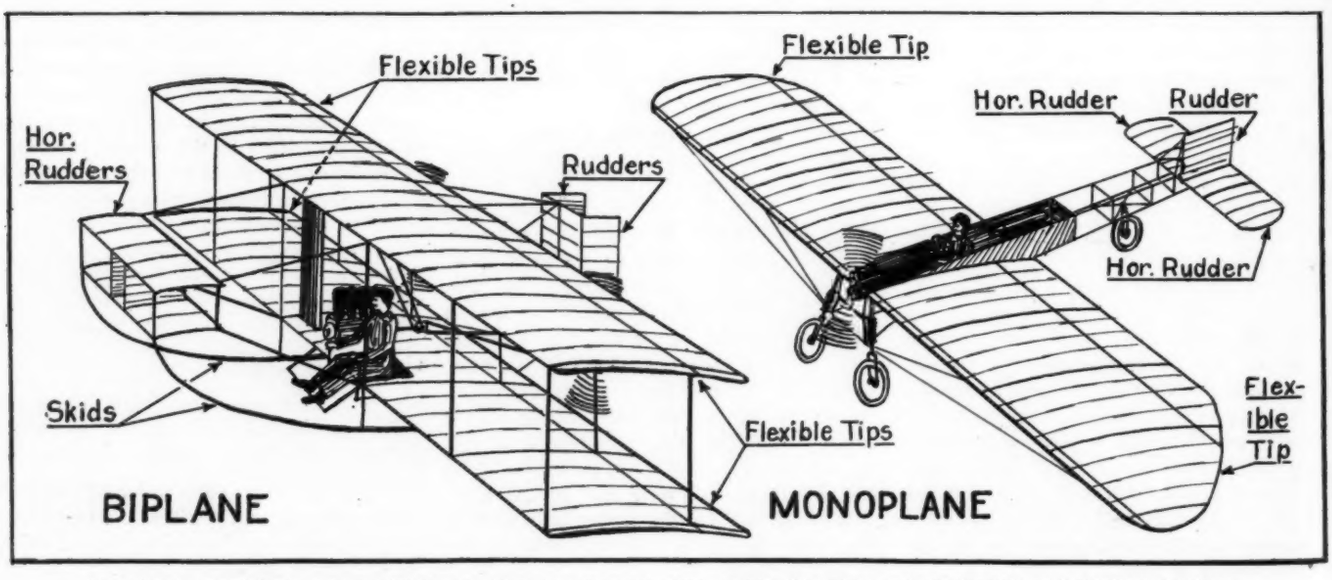

Diagram of Flexible Planes Used by Wrights

The Wright brothers have done a great deal of experimental work, the results of which have been incorporated into their machines in many ways, some of them no doubt so subtly as to escape even expert notice. The principal feature of their machine, however, and the one on which their strongest patent is based, is the warping-wing principle. The purpose of this is to maintain the lateral equilibrium of the machine. Any sidewise tipping, such as is often caused by an irregular gust of air, cannot be corrected by any form of rudder, as the machine has no sidewise velocity. It is like a ship without "steering way." The Wright method of dealing with these deflections is to make the tips of the planes or "wings" flexible, so that at the will of the operator they can be bent to meet the air currents at a greater or less angle. The greater the angle, within limits, the greater is the lifting effect. Then if one side of the machine sinks down, the wing tips on that side are bent to secure a greater lifting effect, and that side is raised until the machine is again on a level. In practice, the levers and wires controlling the twisting of the wings are interconnected so that when the angle of one wing is increased, that of the other is lessened; thus the aeroplane is brought to the desired level by lifting the lower side and lowering the upper side.

Other aeroplanes, notably that of Curtiss, use small movable auxiliary planes, one on each side, to obtain the same result. These planes may be clearly seen in the picture of Curtiss' machine in THE AUTOMOBILE for August 19, page 301. Bleriot on his monoplanes uses the Wright method.

The use of skids instead of wheels on the Wright aeroplane, as well as the starting track and the tower with the falling weight to give the machine its initial impulse, are merely details. It might just as well—better, in the opinion of most experts—be made with wheels, and get its start by running along the ground.

None of these machines incorporate any device for maintaining stability automatically; the operator must not only steer in the usual sense of the word, but also he must control the elevation and prevent his craft from being tipped over to either side. Undoubtedly the greatest development in aeroplane design will be the invention of some means of keeping the machine on an even keel and headed in its original direction without the intervention of the operator. Such a device, successfully applied, would make aeroplaning as safe as automobiling, and as easy to learn. The most promising form appears to be some application of the gyroscope; at any rate, this is a great chance for some clever inventor.

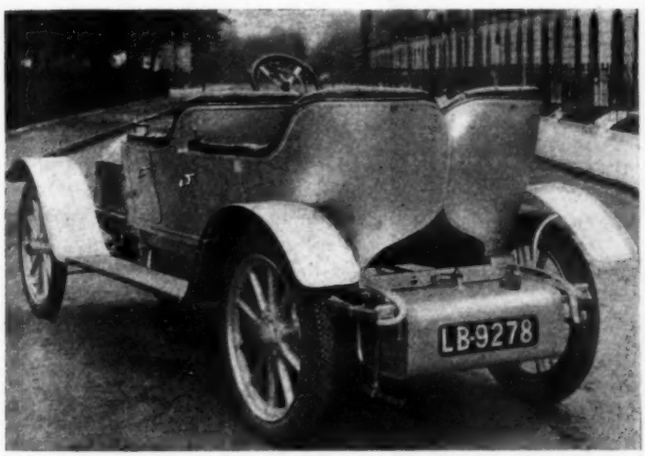



Aeroplanes of Wright and Bleriot Types, Showing Arrangement of Flexible Tips and Horizontal and Vertical Rudders

## EFFECT OF AUTOS ON ROAD SURFACES

WASHINGTON, D. C., Aug. 30—The Department of Agriculture, through its bureau of Good Roads, has begun a series of experiments designed to show the effect of automobile traffic on the surfaces of highways. The accompanying photographs illustrate the results of the first tests, which were made on what is known as the Conduit Road. This highway extends through the northwest suburbs of Washington and is of the ordinary type, having a stone base surfaced with ordinary macadam. The automobile used had a speed capacity of rather over a mile a minute, and provision was made for timing it over a measured stretch. By the side of the road a camera with a shutter giving an exposure of but the two-thousandth part of a second was placed where a direct view of the roadbed and car could be secured.

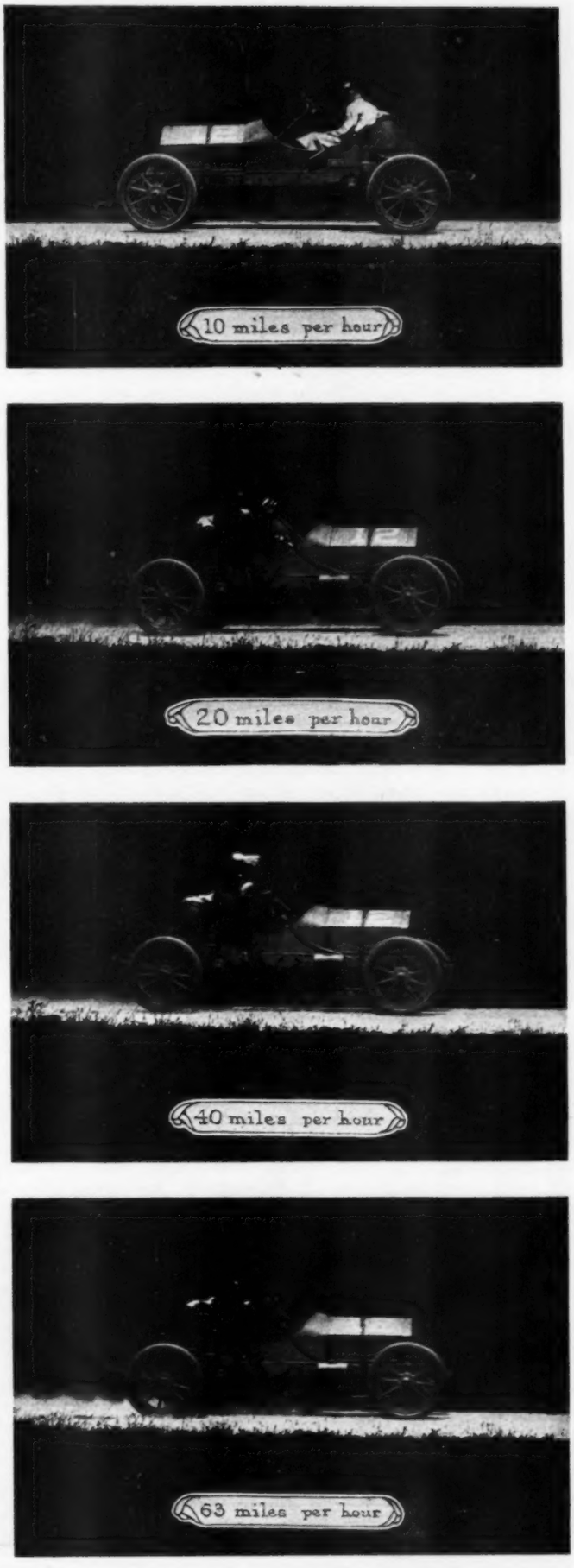
The four different views taken are reproduced with this article. At a rate of 10 miles an hour no dust whatever was visible in the picture, apparently proving that this rate of speed has no effect on the surface of the highway. At 20 miles an hour a small quantity of dust was raised, seemingly by the action of the rear wheels alone. At 40 miles an hour a slight increase in the amount of dust raised can be observed. The last photograph, taken at a speed of 63 miles, clearly shows that the friction was very great. As might be expected, the front wheels of the car seem to have a very slight effect; no dust rising behind them except in the last trial, when a faint haze may be discerned.



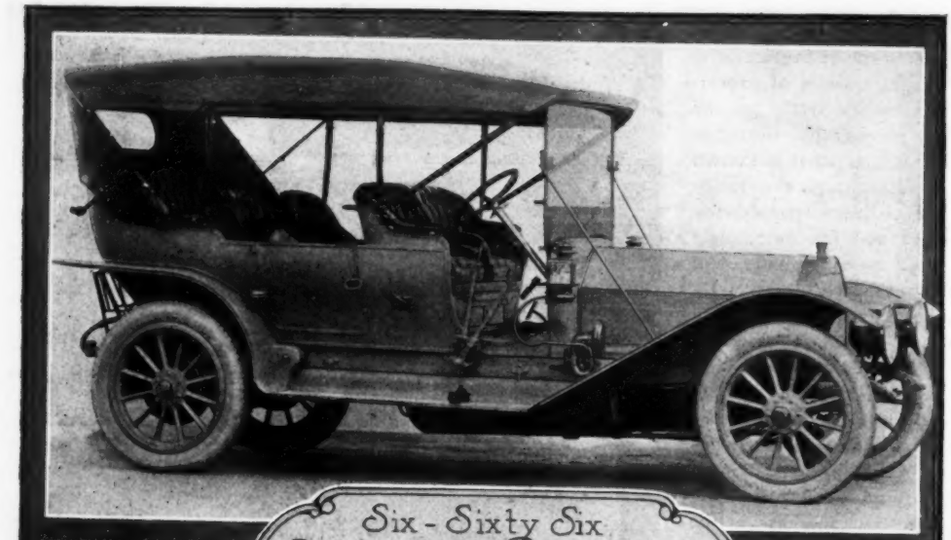

Rear View of the Latest European Dustless Body

## DUSTLESS BODY AT LAST DISCOVERED?

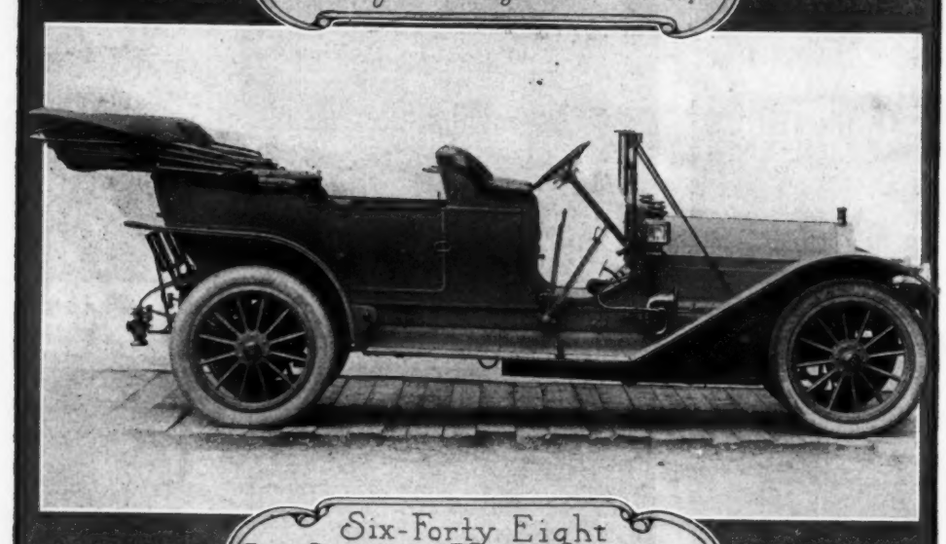
LONDON, Aug. 25—In a recent issue of THE AUTOMOBILE there were illustrated several examples of the "flush sided" or torpedo body, now so popular in England. Another type, embodying some new features, is shown in the accompanying photograph. The chassis is a standard 23-30-horsepower Austrian Daimler, with a wheelbase of 123 inches. The side view of the body reveals merely the ordinary torpedo construction, with the usual high doors. The novelty consists in the construction of the rear portion, which has a clear opening from the underpart of the body. It will also be noticed that the rear panels are curved around in a peculiar fashion. Both these features have been adopted after lengthy experiments by the builders, the Max Graddon Company, with a view to lessening the dust-raising qualities of the car. It is found that the vacuum usually existing behind the rear seats, which is the most potent cause of dust-raising, is entirely obviated by the provision of the "tunnel" arrangement, as the air sweeps freely around the corners of the seats. Observation fully confirms the maker's claim to almost complete dustlessness. An additional advantage claimed is that the car is considerably faster with this body than with a body of standard type and the same sectional area. The advent of these new bodies will be welcomed by all classes of road-users; for they not only do away with the trail of dust, but also with the clouds which frequently pour over the back.




Showing Dust Raised at Four Widely Different Speeds



Six-Sixty Six
Pierce-Arrow Seven
Passenger Touring Car with Top.



Six-Forty Eight
Five Passenger Pierce-Arrow
Tourer, Top Down

Six-Thirty Six Runabout
for Three. Baby of the
Pierce-Arrow Family

# Pierce Arrow for 1910

IN view of the consistent development of the six-cylinder type of car in the hands of the Pierce-Arrow engineers during the past three or four years, the announcement that the Pierce-Arrow Motor Car Company, Buffalo, N. Y., will devote its entire energies to the production of sixes during the 1910 season, will not come as a surprise. In all probability, it will follow the same policy from now on, but what will be decided on a year hence is a matter for the future. Three models are listed, the Pierce-Arrow 6-36, five passenger car, the 6-48 and the 6-66. As may naturally be assumed, all three are of uniform design and are characterized throughout by features of design and construction that are essentially Pierce, their differences being almost entirely those of dimensions. The four cars which made such a brilliant record in this year's A. A. A. Tour were the very first representatives of the new 1910 series to come through at the big plant in Buffalo, and they were only on the road in the hands of their drivers a week or two in advance of the start from Detroit.

There are probably not more than two or three other American automobile builders in the field who have so faithfully adhered to a basic design for such a number of years, so that it is naturally out of the question to look for any radical changes. Of improvements there are many, and all of a nature that strikingly demonstrate how closely opportunities are sought to better things here and there in the constant effort to attain the goal that so many builders are seeking—the perfect car. The performances of the cars in past years have convincingly shown that they represented such a close approach to this ideal from the mechanical point of view till little was left to be desired. But in the building of such a large number of cars, new points are constantly to be gleaned in the exacting school of experience, and as many of these, as have, during the past year, successfully withstood the searching test to which every innovation is subjected at the Pierce factory, have been adopted as standard features of the 1910 product. That the Pierce Company has based its

# SIX CYLINDER FORM and THREE HORSE-POWERS

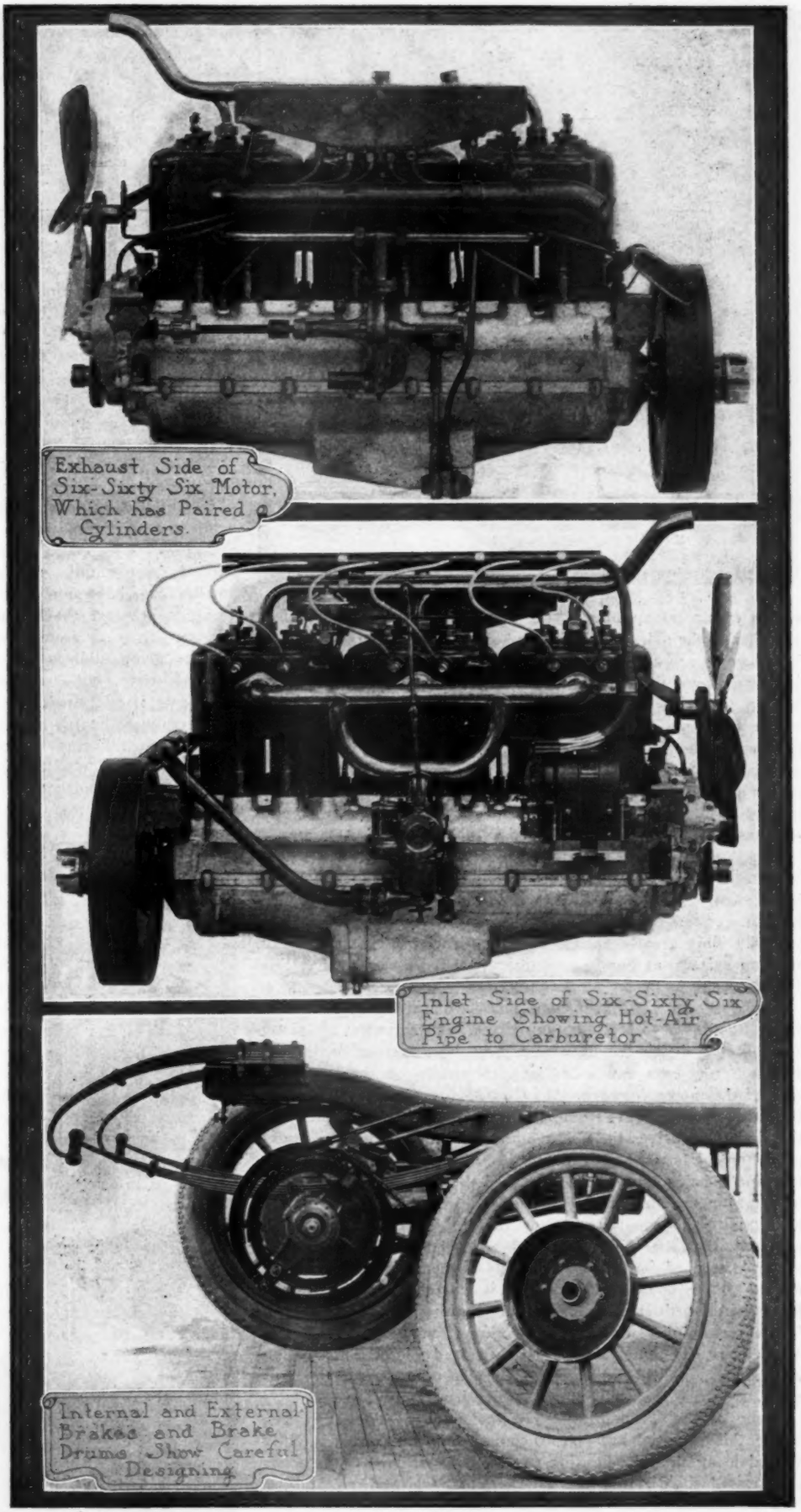
decision on a thorough knowledge of the situation where the six-cylinder car is concerned and has full confidence in the demand for this type, is quite evident from the fact that plans have been made to increase the output of Pierce-Arrow cars fully 50 per cent. over last year, when both fours and sixes were built.

As the three models listed for 1910 are practically identical in every respect, a description of one will suffice for all, and as all the essential features of the design have not undergone the slightest alteration, a resumé of the improvements will be of greater interest than a recital of the 1910 specifications.

Aside from a slight increase in the dimensions of the cylinders, one of the chief changes in the Pierce motors has been the addition of an oil ring, or groove, at the lower end of the piston. The Pierce-Arrow circulating system of lubrication is so positive and forces such a quantity of oil to the bearings, that the baffle plates in the crank-case did not prevent an excess supply from reaching the piston and finding its way to the combustion chamber. Placing the oil ring in question on the pistons has added fully 50 per cent to the mileage obtainable on a single charge of lubricating oil.

The cylinder bore of the six-cylinder, 36-horsepower motor has been increased from 3 15-16 to 4 inches, while the motor dimensions of the 48-horsepower type remain the same as formerly. The motor of the 66-horsepower car has been practically redesigned since last year, the separately cast cylinders having been abandoned in favor of twin castings, making all motors uniform in this respect. The crankshaft is still of the seven-bearing type, however, a liberal amount of bearing surface being specified for all the journals.

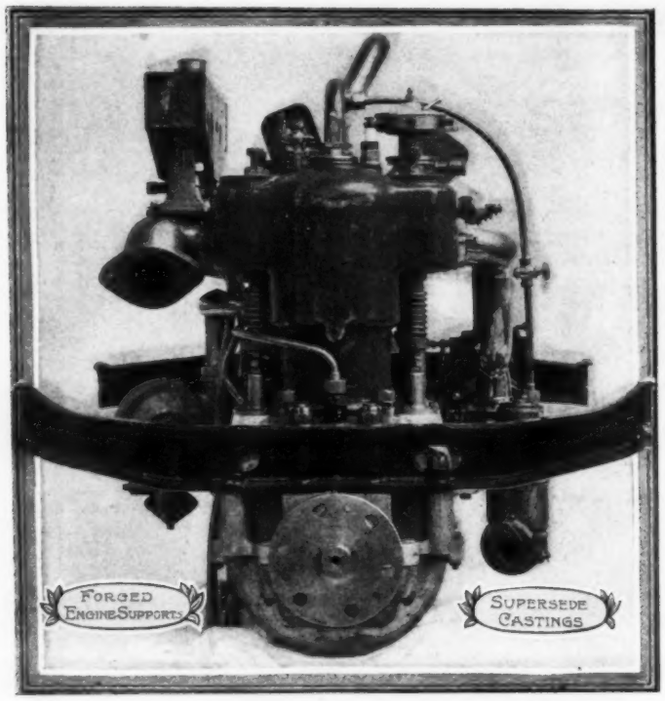
Specified on all models is the new type of carbureter—first adopted as standard last year, after a great deal of experimenting. It is of conventional design so far as the gasoline supply and spraying devices are concerned, but is fitted with a particularly ingenious type of auxiliary air valve, which is doubtless largely responsible for the extreme regularity of running



Exhaust Side of Six-Sixty Six Motor, Which has Paired Cylinders

Inlet Side of Six-Sixty Six Engine Showing Hot-Air Pipe to Carburetor

Internal and External Brakes and Brake Drums Show Careful Designing




of the cars at all speeds. This air valve consists of a cylindrical chamber in the sides of which are placed vertical rectangular ports. These ports are covered by spring brass reeds, and are of varying dimensions, there being three in all. These reeds are in turn backed by flat leaf springs of varying tension, so that as the motor speeds to a point beyond the normal air supply, the first reed opens slightly until checked by the retarding influence of its spring: then more and more until fully open, when the next larger port begins to open, and so on until all are in action. This is very gradual and makes the carbureter extremely sensitive to changes of motor speed and load.

The Bosch magneto is retained as the service side of the dual system of ignition, a six unit set of plain Autocoils, synchronized by a master vibrator having been adopted for the emergency ignition system, in place of the six vibrator coils formerly employed. This greatly facilitates the adjustment of the battery ignition system, as but one vibrator has to be regulated. It is fed as usual, by a set of accumulators.

Doubtless the most important innovation in connection with the motor has been the adoption of the Spencer power air pump for inflating the tires. This is of a special design made for the Pierce-Arrow cars and is mounted vertically on the left hand side of the motor forward. It is bolted directly to a bracket on the side member of the frame and is arranged to be driven from the shaft that drives the water pump. A small bronze pinion is placed on the latter, and is intended to mesh with a gear of about two and a half times its size attached directly to the crankshaft of the twin cylinder pump. A ball and spring lock controls the position of the small movable pinion in the off and engaged positions, the latter being designed to be meshed by hand. The motor is stopped for that purpose and is then run slowly, not to exceed 300 to 600 r.p.m., at which it will suffice to inflate the largest tires to the maximum pressure required in a few minutes.

The remaining essentials of the motor remain unaltered, and as they are the same as have characterized Pierce construction ever since a multi-cylinder motor has been put out under this name, they are too well known to require description.

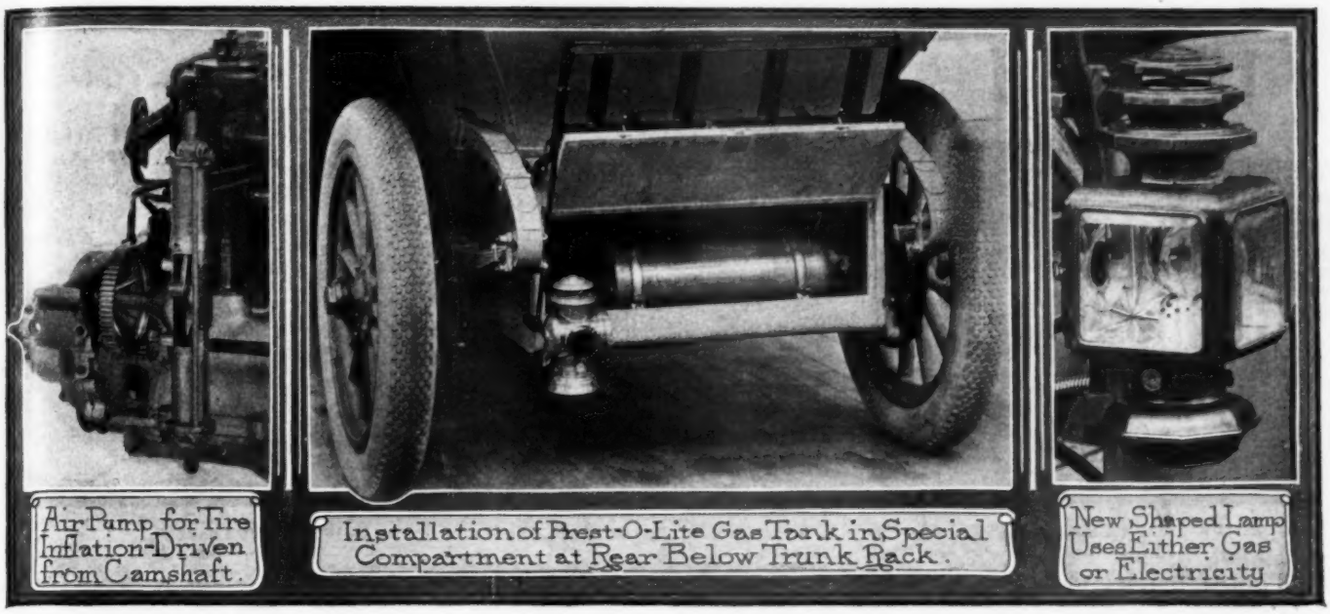
**Some of the Transmission Improvements**—The changes where this essential are concerned are simply those of slightly altered location. The housing of the gear set in each case has been raised slightly, 1-4 inch on the 36-horsepower car, and 3-8 inch on the other two models, and the shifting lever has been lengthened 2 inches on all models, to facilitate its handling. The arrangement of the foot brake and clutch levers has also been altered slightly, giving a great increase in the leverage and making it much easier to apply them. The gear-set is of the sliding type, selectively operated and gives four speeds forward and reverse, the shafts and gears being made from Krupp chrome nickel steel. The moving members are splined to their shaft, while the gears on the countershaft are bolted to flanges made integral with the shaft.

A change has been made from the Hess-Bright annular ball-bearings to Timken roller-bearings for the outer ends of the driving shafts of the live rear axle, in view of the ability of the roller type to withstand thrust stresses. This has also led to the exclusive use of Timken bearings for the front wheels, a change which entailed the use of entirely new steel stampings for the front hubs. Hess-Bright ball-bearings are used on all other moving parts, except the motor. Pressed steel has also been adopted for the brake drums and the dimensions have been increased in each case, in view of the slightly added power of the motors and the longer wheelbase of the cars, this increase in braking power averaging 25 per cent. Thicker Raybestos brake linings are also specified, and an improved arrangement of the brake hangers gives increased leverage with the same effort.

**Chassis Changes Generally Are Few and Far Between**—Wheelbases have been lengthened in every instance, the 36-horsepower car having been increased from 119 to 125 inches, while the 48-horsepower is now 134 1-2 inches, instead of 130, and the 66-horsepower model is 140 inches, instead of 135. The three-quarter elliptic springs first employed last year on the smaller cars have now been adopted as standard on all, and in order to preserve the height of the chassis at the same level, a dropped type of frame has been employed and the forward springs given slightly less arch. To compensate for the increased length of the car, the forward axle has been strengthened by giving it slightly heavier flanges.

The running boards have been made two inches wider throughout their length, and a sheet metal apron placed between them and the under side of the frame. This extends the entire length between the mudguards and completely encloses the sides of the car from front to rear. A new type of mudguard has been adopted, the forward ones being made with a straight slope to the rear, which facilitates the closing in of the sides. A 7-8 inch flange is now placed around all guards. A special housing is riveted to the forward end of the rear mudguard in order to encase the protruding end of the rear spring. Automatic grease cups are now provided on all spring shackle boats.

An additional lock has been placed on the ball thrust bearing supporting the steering column, and the latter has been given a slightly greater rake



Air Pump for Tire Inflation-Driven from Camshaft.

Installation of Prest-O-Lite Gas Tank in Special Compartment at Rear Below Trunk Rack.

New Shaped Lamp Uses Either Gas or Electricity

on the touring and enclosed cars, this being a 50 degree angle on the 36-horsepower car, and 49 degrees on the other two models. The hollow type of dash has been adopted for the 36-horsepower car making all three uniform in this respect, while the use of bright brass molding has been abandoned, aluminum covered with paint being employed instead. In addition to the slightly altered angle of the steering column, the control levers have also been arranged so as to be much more convenient. The steering wheels have been increased to a diameter of 18 inches.

**Increases in Tire Equipment**—Doubtless the most striking changes to be found on the new cars consist in the greatly increased size of the tire equipment to be provided on the 1910 models. Pierce-Arrow cars have always been noted for the liberal factor of safety afforded by their tire equipment, and the increases have been made in keeping with this policy. The 36-horsepower touring car, landaulet and brougham will be fitted with 36 by 4 and 4 1-2-inch tires, instead of 34-inch as last year, while the 48-horsepower cars will have 36 by 4 1-2 and 37 by 5-inch front and rear. Although larger diameter tires are employed for the rear wheels, all are interchangeable on the same rims, so that a rear tire may be used on a front wheel where desired, or vice versa, in case of emergency. This would not be recommended except in such cases, as it would impose an additional strain on the differential on the rear and would tend to render the steering difficult when used in front. The tire equipment of the 66-horsepower car consists of 37 by 5-inch front and 38 by 5 1-2-inch rear on the touring and enclosed types, the miniature tonneau and roadster being fitted with 37 by 5-inch tires all round, the equipment of these types of cars in the 36 and 48-horsepower models also being slightly smaller than those mentioned for the touring and enclosed cars.

The runabout and miniature touring types are built on special chassis in each case, the wheelbases being shorter and the bodies not being interchangeable on any of the other chassis. The brougham and landaulet bodies are interchangeable with the five-passenger touring type of the 36-horsepower model, this being listed as a strictly five-passenger car while the enclosed and touring bodies of the higher powered cars are interchangeable on either of the chassis, a 48-horsepower touring or landaulet body fitting a 66-horsepower chassis and vice versa.

Chief among the remaining changes to be mentioned are those of equipment. In place of the gas generator formerly supplied, a large sized Prest-O-Lite tank has been substituted, and a special box hung from the frame at the rear has been designed to accommodate it. This box is kept locked, and as a special supply cock is placed in the feed line just outside of it to turn the gas on or off, it does not have to be opened except to receive a new tank when the old one is empty.

In place of the gasoline gauge formerly placed on top of the gravity fuel tank under the forward seat, a special sight gauge glass is now mounted on the dash in plain sight of the driver, and a small electric lamp and push button are supplied to illuminate it at night. The gasoline feed pipe to the carbureter is also supplied with a union at each end, thus greatly facilitating its removal.

During the past year the Pierce art department has been at work on the designs of new fittings, and the result is to be seen in the new hexagonal lamps, door handles and the like. These designs are exclusive on the Pierce cars and the same motif will be employed throughout in the ornamentation.

Not only do these have a distinctive and different shape, but they are different, in that they are fitted to use either or both electricity and gas. The regular gas burner is located in the usual mid-position, while back of it, and slightly higher, is located the bulb of the electric lighting system. This is a small one of tungsten filament, and will give a light fully equal to that of the compressed gas.

The lengthened wheelbases combined with the unusually large sized tires will make for increased easy riding, if that is possible on cars of the high grade of the Pierce-Arrow. The big six rear tires are probably as large as any now in use on a regular model. Several other cars have larger tires, but these are only sent ou on special order.

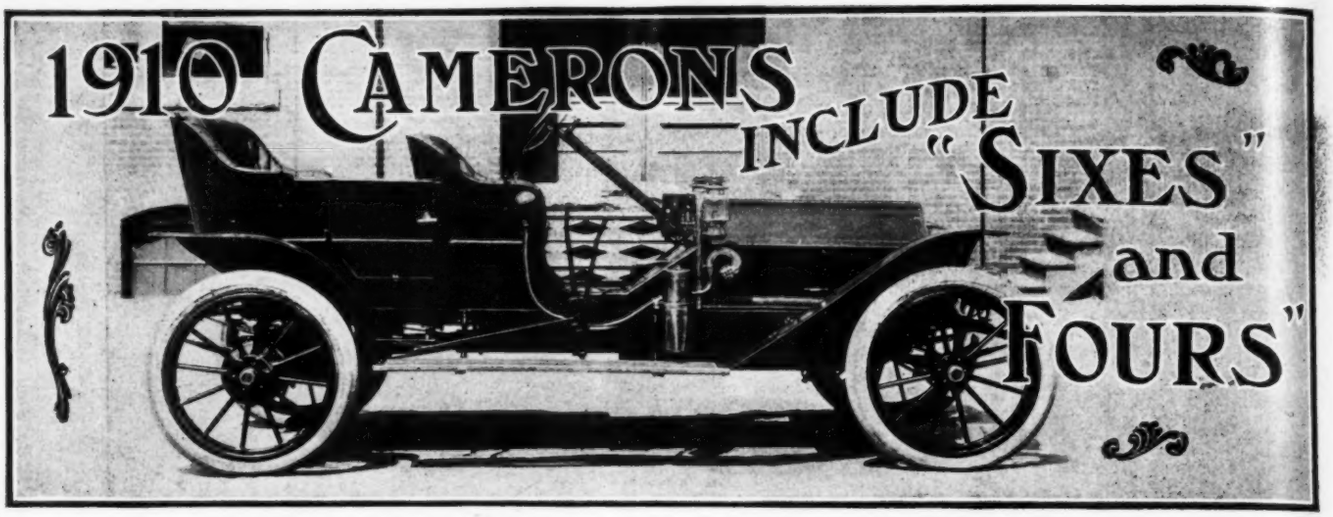
**Something About Horsepower Ratings**—In the following table it should be explained that the A. L. A. M. formula uses as a basis in computation a piston speed of 1,000 feet per minute. On this plan the number of revolutions of the 36 and 48-horsepower motors under the A. L. A. M. rating would be 1,262 revolutions and the 66-horsepower motor 1,090 revolutions. The nominal rating of the Pierce motors, according to various rating formulas, is about as follows:

| | 36 | 48 | 66 |
|---|---|---|---|
| A. L. A. M. | 38.40 | 48.6 | 66.20 |
| Beaumont 750 Rev. | 30.48 | 43.32 | 63.72 |
| Beaumont 1000 Rev. | 40.68 | 57.72 | 84.90 |
| Royal Automobile Club | 46.26 | 51.75 | 69.90 |

A general summary of the important motor dimensions, wheelbases and tire sizes of Pierce-Arrow cars is:

| | 36 H.P. | 48 H.P. | 66 H.P. |
|---|---|---|---|
| Motors | 4 x 4 3-4 | 4 1-2 x 4 3-4 | 5 1-4 x 5 1-2 |
| Wheelbases | | | |
| Runabout and miniature tonneau | 119 | 128 | 133 1-2 |
| All other styles | 125 | 134 1-2 | 140 |
| Tires | | | |
| Runabout and miniature tonneau | 36 x 4 | 36 x 4 1-2 | 37 x 5 |
| All other models, front | 36 x 4 | 36 x 4 1-2 | 37 x 5 |
| All other styles, rear | 36 x 4 1-2 | 37 x 5 | 38 x 5 1-2 |

# 1910 CAMERONS INCLUDE "SIXES" and "FOURS"



Six-Cylinder Touring Car Has a Long, Low, Rakish Appearance and Is Just as Fast as It Looks

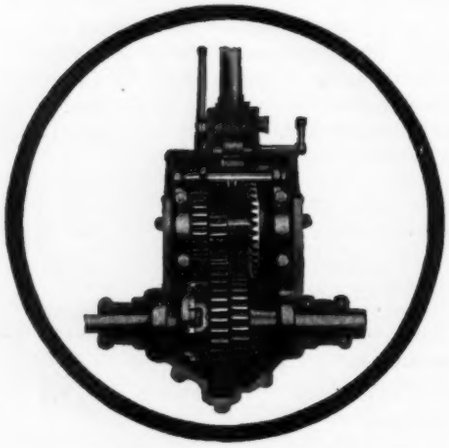
WEDDED as it is to the air-cooled engine and very light construction which goes with it, the Cameron Car Company, Beverly, Mass., and New London, Conn., will produce for the 1910 season both "Sixes" and "Fours," in a variety of runabout and touring car bodies, the former being preferred in the majority of cases. Not only will two separate and distinct types, such as a four and a six, be built, but they will be manufactured in two separate and distinct factories, each devoted to a single style and type of car. This should result in each one being superior to what it would be if the two were made under the same roof. The fours are manufactured at the Beverly plant and comprise five models, including two-passenger runabout, special two-passenger featherweight flyer, three-passenger roadster, four-passenger surrey with detachable rear seat, and standard touring car. The prices range from $950 to $1,100. The sixes are manufactured in the new plant of the Cameron Company located at New London, Conn., and the line comprises five models as above, all listing at $1,500.

It has been the policy of the Cameron Car Company from the very earliest days of its existence in 1902 to manufacture its cars complete in its own works, and this policy is being pursued in exactly the same manner to-day. The four and six-cylinder cars are manufactured in separate plants which build, from the ground up, all parts which go into their respective cars.

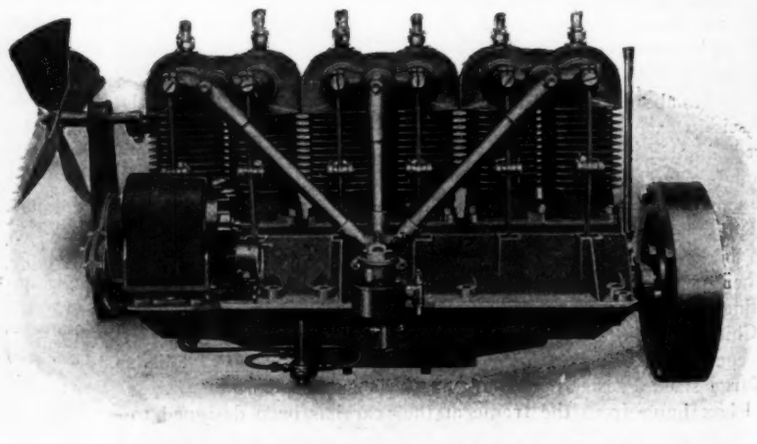
The motors for the coming season show no radical changes and are built along the lines on which Cameron has been working for the last seven years. Minor improvements will be found, but reference to the illustrations herewith will show that important features such as the system of air-cooling and location of valves remain the same as heretofore. The four-cylinder motor is 3 7-8 bore by 3 1-2 stroke, developing 24 horsepower, and the "Six" developing 36 horsepower. Both are regularly equipped with high tension dual system of ignition, which includes the magneto and auxiliary set of dry cells, gear pump, constant level oiling system of a very simple, effective design, oil being carried from a large chamber on the lower side of the engine base through a tell-tale on the dash and forced into the crankcase under a high pressure, where it is sprayed on shaft and connecting rod bearings. Thence it flows to the bottom of the case and lubrication is furnished to the cylinders by splash. The engine base is of aluminum, split horizontally in the center, the cylinders cast singly with radial fins.

Clutch is a self-contained cone of proportionately large diameter and easy angle of contact. Engine bearings are of nickel babbitt; camshaft bearings, case-hardened steel set in cast-iron bushing, and crankshaft rocker arms and all important small parts are of drop forged nickel steel. The wrist pin construction of these motors is the same as has been used by Cameron for years and is slightly different from that known to general practice, the wrist pins being steel drawn tubes, hardened and ground, with a hardened and ground connecting rod swinging directly upon them with no bushings whatever, thus giving two round surfaces as a bearing. These will run almost indefinitely without showing any signs of wear whatever. It is claimed that this construction will outlast half a dozen bronze bushings.

**Transmission Rear Axle System**—This is of the Cameron patented type, three speed selective, direct drive on all speeds. The six-cylinder system is slightly different from that used on the four-cylinder cars. This change will readily be understood by those who are familiar with the transmission. On the lighter

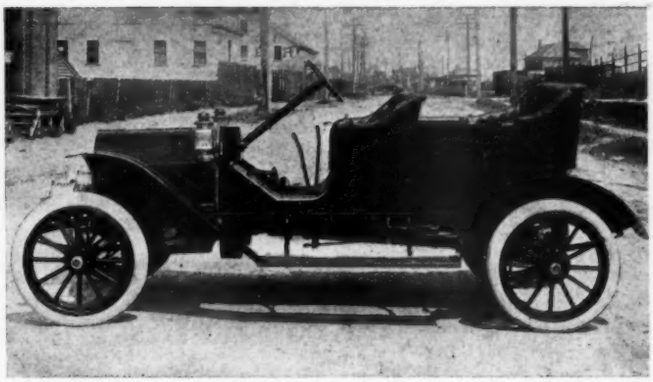


Six-Cylinder Transmission Is New



Inlet Side of Six-Cylinder Engine Shows Few Changes

machines, that is, the four-cylinder line, the transmission carries three gears on the cross or jackshaft and one on the differential, while on the heavier transmission used in the six-cylinder cars, two gears are carried on the cross-shaft and two on the differential. While all of the six-cylinder models weigh less than 1,700 pounds, still this car is slightly heavier than previous models, and with the great power of the motor, of course, requires a heavier gear all round than the four-cylinder cars. The power is delivered from the engine to the rear wheels through a single universal joint to driving shaft and bevel gears, to the cross or jack-shaft, and finally, from the cross-shaft by wide face spur gears to the rear axle. The advantage gained in this construction aside from the fact that the gears, instead of being thrown into mesh sideways, are thrown directly together face on and rolled together with a natural motion, is the fact that the bevel gears never receive more than the engine pull, and being set up firmly in mesh in a solid steel frame running on adjustable ball bearings, have no chance of springing out of mesh under heavy load or showing any undue wear, which means loss of power to a bevel gear.



As the Four-Cylinder Touring Car Appears

In shifting gears, the arch carrying the gear set is first thrown forward in the case when the combination of gears wanted is thrown into line. When traveling crosswise in the case there is no strain against the gears to prevent sliding over. Gears are then brought together, face on, with a natural rolling motion which prevents jar, shock, or any injury to the gears themselves, as no strain of the engine pull can be put upon the driving gear until they are firmly in mesh and locked into position. The reverse gear stands idle except when in use, and is then thrown down in mesh from the top of the case. All gears are of unusually wide face and coarse pitch, are made up of drop forged blanks of chrome nickel steel, as are also the shafts. Ball bearings are used throughout the transmission and rear axle and are of annular type, of Cameron's own construction.

The application of drive to the chassis is the same as has always been used, that is, the drive is carried by a steel tube to a point directly back of the clutch. The distinct advantage claimed by this construction is that there is no tendency to lift on the chassis, but rather a straightforward push which holds the car steadily to the road even at extreme speed.

The rear axle itself is of the semi-floating type and equipped with internal expanding emergency brakes, also external contracting flexible bands on the wheel hub. The front axle is a seamless steel tube with drop forged ends and annular bearings used throughout the wheels. Frame is of pressed steel; springs are semi-elliptic front, full elliptic rear. Steering gear is composed of an adjustable enclosed rack and pinion.

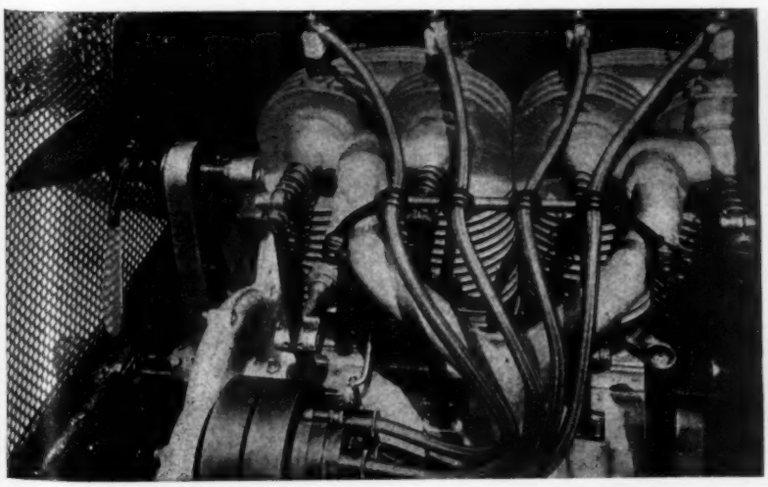
Road clearance of all models is unusually good, and while much greater than cars of similar type, still the center of gravity is kept down to a point below that of many other cars of their class by reason of the method of carrying the transmission and the hanging of the motor in its sub-frame.

The weight distribution is excellent, the motors being hung well back of the front axle, and this, with the method of applying power to the chassis, gives the cars extreme stability.

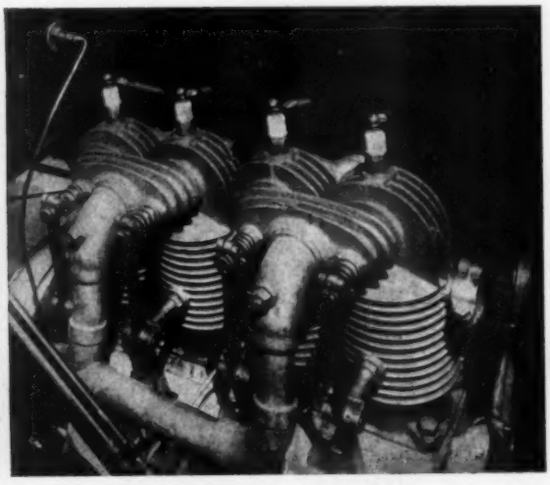
**More About the Speed**—All models are very fast, it being claimed that while 75 per cent of the purchasers will remark that a car doing "twenty-five miles an hour is sufficient for anybody," that there is too much red blood in the veins of the average American citizen to sit back and let anyone throw dust in his eyes if he can help it.

This result is not sought after but is obtained incidentally to the light-weight construction, which, to use a roundabout way of figuring, comes from the use of the air-cooled motor of high efficiency. That is, the engine gives such a high ratio of power to weight, that combined with extremely light other parts, the *ensemble* is of unusual lightness. So much is this the case that this car may not participate in races sanctioned under the new racing rules. This is brought about by the fact that the new rules specify a minimum weight, and in framing them up, this lowest admissible figure was set so low as to go below the figure actually attained by Cameron. So, it is that, while actually "hankering" for a chance to race the cars against other and natural competitors, this company has been obliged to either abstain or go out of its class and meet much higher powered cars, with which it does not compete naturally. So, this competition would show nothing worth while. The Cameron Company uses this argument in favor of a revision of the existing rules under which racing is conducted.

The company has expanded greatly in the last year and states that for the 1910 season it will be the largest producers of air-cooled four and six-cylinder cars in the United States.



Inlet and Ignition Side of the "Four" 24-Horsepower Motor



How It Looks from the Exhaust Side

THE AUTOMOBILE

Vol. XXI Thursday, September 2, 1909 No. 10

THE CLASS JOURNAL COMPANY

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ENGLAND:—W. H. Smith & Sons, Ltd., 186 Strand, London, W. C., and all bookstalls and agencies in Great Britain; also in Paris at 248 Rue de Rivoli.
FRANCE:—L. Baudry de Saunier, offices of "Omnia," 20 Rue Duret, Avenue de la Grande Armee, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

## AVIATION'S UNUSUAL DEVELOPMENT

History has been made so rapidly in the new science of aviation that this staid old world is still rubbing its eyes in amazement, unable quite to comprehend what has happened. First Orville Wright dashed ten miles cross-country, over hills and ravines, carrying a passenger; one morning Louis Bleriot, with astonishing facility, flew across the English Channel; then the Rheims aviation tournament began, and since then miracle has followed miracle so swiftly that it has been difficult even to keep their record.

Last summer, when Orville Wright was making his first trials at Fort Myer, we declared our belief that the fundamental principles of aviation had been discovered, and that after perhaps a decade of experimenting and perfecting present designs it would be possible for the ordinary business man to buy an aeroplane and learn to operate it just as he now buys and operates an automobile. It seemed that the aeroplane was as susceptible of improvement as its forerunner on land, and that equal periods of time would bring equal development. Our prophecy was all too conservative. Not ten years, but a single twelve-month, has sufficed for that development. The progress which the automobile made between 1890 and 1900 the aeroplane has made between 1908 and 1909. Already there are half a dozen reputable firms in this country and abroad engaged in manufacturing aeroplanes as fast as their limited equipment allows, and their order-books are filled for months in advance. Prices range from $2,000 to $5,000. It is no longer thought necessary to guarantee flight; that is taken for granted.

No single feature of the Rheims meet has been so remarkable as the shortness of the training of many of the aviators, and the ease with which they learned to handle their machines. M. Bunau-Varilla, a youth of nineteen, received a Voisin aeroplane from his father as a birthday present; the other day he made a flight of 100 kilometers with the greatest ease. Rougier, a former automobile driver, scored in the height contest and incidentally flew 90 kilometers, with almost no preparation. Fournier purchased a Voisin machine, and after a few minutes' trial took up a friend as passenger and flew around the course. Ruchonnet, a foreman from the Antoinette factory, after some verbal instruction, made a good flight.

In spite of this comparative inexperience of the operators and the great number of machines present—it is estimated that 1,300 flights were made during the week—there was not a single fatal or even serious accident. It is a record of which any sport might be proud. Above all, the meet has conclusively demonstrated that the prospective aeroplanist needs no special talent, no long course of preparation; only a clear head and a steady hand.

## THE PRESENT PRICE OF SPEED

Whether it be in the hazardous undertaking of "competing" in circular track racing, or in the more reprehensible practice of utilizing the public highway as a race-course, it is plainly apparent these days that an alarming price is being paid for speed. Unfortunately, the spectacular performances of the few are magnified in the printing, with the result that the general public begins to ask if all automobilists are not more or less unseated in their reason when at the steering wheel. It is an unfortunate situation that has widespread advertising at the moment, with fatalities in and out of competition, and one cannot doubt but that the effect is decidedly injurious to the industry and pastime.

Many, harassed with natural timidity, are keeping off the roads because of the ever-expected appearance, round the turn in the road, of the man who deserves but seldom gets a jail penalty. In competition, the man who participates usually risks only his own life, though of late there has been, in several instances, inadequate means of safeguarding those who pay to watch a spectacle which not infrequently excels in blood-letting the sports of ancient Rome.

In most instances, it has become nothing more than a gate-receipts proposition, and the idea of betterment in the building of automobiles figures as of decidedly secondary importance. The manufacturers will do well to question the question of further support of mile circular track racing, while the automobile clubs can find a timely field of operations in ridding the road of its inconsiderate occupants.

Less of track sport and less of highway casualties are demanded for the good of automobiling; for the increasing list of killed and wounded is the worst kind of an advertisement, and one which is discouraging to the army of interested ones who have yet to become the possessors of motor-driven vehicles.

# APPLICATION BLANKS OUT FOR ANNUAL A. M. C. M. A. SHOW

NEW YEAR'S Eve proved so fortunate an opening for the Grand Central Palace show in New York this year that Chairman R. E. Olds and his associates on the show committee of the American Motor Car Manufacturers' Association decided that they could choose no better date for the tenth show in 1910. The coming of the new year is always a gala occasion in New York, and automobilists and dealers like to combine the opening night of the show with the festivities which begin on Broadway at midnight. From the selling point of view, too, the date is a good one, as during the first week of the new year dividends amounting to $200,000,000 are disbursed by railroad and industrial corporations.

With the A. M. C. M. A. will also exhibit the members of the Importers' Automobile Salon, and the foreign cars will, as last year, be allotted space on the main floor. The Grand Central Palace show will thus be the only international show in America, and indeed, in the world, as it happens that there will be no Paris Salon this year.

Application blanks for space and diagrams of the floor arrangement have already been sent out to manufacturers who are expected to participate. This year the management has 72,000 square feet of floor space to dispose of, so that the exhibitors will be assured of better facilities than ever before. The main floor and part of the balcony floor will be devoted to American and foreign gasoline, steam and electric vehicles. Commercial vehicles and motorcycles will, as heretofore, be found on the balcony. The second balcony, with odd spaces elsewhere, will be given over to tire and accessory exhibits. The members of the Motor and Accessory Manufacturers have contracted collectively for several thousand square feet on the first balcony.

All applications for space received up to Friday, October 1, will have equal consideration in the first allotment on Friday, October 8. The allotment of space to the members of the Motor and Accessory Manufacturers will be made by that association, and the same plan will be followed for the members of the Importers' Automobile Salon. Members of the A. M. C. M. A. will have the first drawing for vehicle space other than that allotted to the Importers' Automobile Salon.

Associated with Chairman R. E. Olds, of the Reo Motor Car Company, on the show committee are S. H. Mora, Mora Motor Car Company; Benjamin Briscoe, Maxwell-Briscoe Motor Company, and H. O. Smith, Premier Motor Mfg. Company. The Importers' Automobile Salon will again be represented by E. R. Hollander, of the Fiat Automobile Company, and the Motor and Accessory Manufacturers will be cared for by David J. Post, of the Veeder Mfg. Company. The general management of the show will again be under the supervision of General Manager Alfred A. Reeves, of the A. M. C. M. A.

## RULES FOR SAVANNAH-ATLANTA RUN

SAVANNAH, GA., Aug. 30—In connection with the widely extended movement for good roads in this State, and the large number of automobile contests planned for the opening of the Atlanta automobile show, there will be an endurance contest from this city to the scene of the exhibition in November. It will be held by the Savannah *Morning News* and the Atlanta *Constitution*, under the auspices of the Savannah Automobile Club, and will be known as the Georgia Highway Reliability contest. The start will be made from the De Soto Hotel, November 8, with a night stop at Milledgeville, and the finish will be at the Auditorium in Atlanta on the evening of November 9.

The rules as announced are much similar to those of the recent Glidden tour, embodying the principle ones with slight modifications necessitated by local conditions. The cars will have to be run on a definite schedule, with penalizations for lateness, will have to carry observers, and will be charged with time used in making repairs or certain adjustments. Three classes have been arranged, the first for cars catalogued at $2,000 and over, those selling above $1,200 but less than $2,000, and, third, those selling for less than $1,200. For each class there will be a cash prize of $335, with provision for a division of this sum among the drivers in case there should happen to be a tie.

## 1909 VANDERBILT CUP SEEMS ASSURED

NEW YORK, Aug. 30—Assurances that there will be a Vanderbilt Cup race this fall are now regarded as certainties. At Albany the Motor Cups Holding Company was incorporated today, "organized to promote automobile races for the silver cup donated by William K. Vanderbilt, Jr., and known as the Vanderbilt Cup, and for the gold cup donated by the Automobile Club of America, and known as the Grand Prize." The capital nominated is $5,000, and the incorporators include for the most part directors of the parkway. The names connected with it, at Albany, are: William K. Vanderbilt, Jr., Henry Sanderson, Colgate Hoyt, Harry Payne Whitney, Henry B. Anderson, Elbert H. Gary, William Pierson Hamilton, H. B. Hollins, Dave Hennen Morris and Mortimer L. Schiff.

The formation of this company is in line with the agreement reached by the A. A. A. and the A. C. A. last year by which the new company would promote the two great events over the Long Island motor parkway. Within the last few days the Manufacturers' Contest Association, composed of the automobile manufacturers, took a mail and telegraph vote as to what concerns would enter the Vanderbilt Cup contest, if it were organized and held this fall. It is reported that the results were surprisingly satisfactory.

# FAIRMOUNT PARK RACE ENTRY LIST HALF FILLED

PHILADELPHIA, Aug. 30—Half of the number of cars which are permitted in the Fairmount Park 200-mile stock car race of the Quaker City Motor Club have been entered. Last week saw the number raised from six to ten, through the listing of two six-cylinder Thomas cars, a Benz and a Welch. All of these are Bergdoll interests, so that the young millionaire will have the greatest chance to win, if numbers count. The big Thomas cars will be driven repectively by Louis J. Bergdoll and Willie Haupt, the Benz by E. R. Bergdoll, and the Welch by Al Hall. Those entries made previously are: Acme, Leinan driving; Palmer & Singer, Walace; Simplex, J. F. Betz, 3d; Apperson, Herbert Lytle; Kline-Kar, and Lozier.

The charity feature of the event has attracted widespread attention, and many of the people most prominent in society, municipal and business circles will be found actively engaged when the end of the vacation season arrives. The University of Pennsylvania students have volunteered as ushers. The Globe Printing Company has donated all the printing of tickets for parking spaces and grand stand seats. If necessary, there are several local military organizations which may be called upon as guards, in addition to the 1,200 of the "finest" which the city authorities will have on the eight-mile course. Arrangements have been perfected for locating the repair and supply pits in front of the stands, thus giving the spectators a fine view of the quick action.

## LOWERED FREIGHT CHARGES ON AUTOS

NEW YORK, Aug. 30—Through the efforts of the traffic department of the National Association of Automobile Manufacturers, a signal reduction in the freight rates on automobiles has been secured. Dealers, manufacturers, and the public, alike, will be interested in the announcement that, after October 1, the railroads will charge for shipments of single automobiles on an actual weight basis. Heretofore the rates have been made with a minimum of 8,000 pounds, for first-class freight, for all passenger machines with wheel bases exceeding 86 inches. As the majority of the popular-priced autos at present have longer wheel bases than this, there has been much complaint against a rating of 8,000 pounds for these light cars.

By the new arrangement there is claimed a more equitable distribution of the transportation charges, so that smaller machines will be taken at an equivalent of 5,000 pounds at first class. The charges will be increased only as the weight, size, and value increase. Similar changes will be made in the shipments of boxed or crated material, on which actual weight will apply, instead of the fixed medium. The new classification affects shipments originating in the Northern States east of the Mississippi river, thereby including practically the entire manufacturing belt. The Association's traffic department effected an arrangement on a similar basis with Western and Southern roads some time ago.

The entire automobile industry is represented in these matters by the N. A. A. M. traffic department, for it has an agreement with both the Association of Licensed Automobile Manufacturers and the American Motor Car Manufacturers' Association. J. S. Marvin is the general traffic manager, and the various automobile makers co-operate with him. To make the requirements of the industry known, Mr. Marvin attends the meetings of the railroad rate committees at various points, and thus keeps the automobile industry in close touch with transportation affairs.

## TOLEDO'S AUTO INDUSTRY STILL GROWS

TOLEDO, O., Aug. 30—Through the organization of the Warner Gear Company this city gets another branch of the automobile industry, the third established here recently. The new concern has been formed by F. W. Warner, of Muncie, Ind., and arrangements have been made with the Overland Automobile Company to house it until a factory building can be erected. The machinery has been shipped and will be turning out gears as soon as possible. The Overland Company has given the new firm a contract for the manufacture of its gears and the new plant will be constructed on ground adjacent to the Overland factory. About 100 men will be employed at once and that gradually increased to the maximum of 500.

The third member of the trio, and the second established, is the Kinsey Manufacturing Company, which makes radiators, frames and sheet metal material. All three will be located on the same property, for the Overland interests have purchased five additional acres which will give space for several buildings. J. N. Willys, president of the Overland Motor Car Company, has stated that the force at the local factory will shortly be increased to 1,000, and that the greater part of the 1910 output will be produced in Toledo.

## INDICATIONS OF INCREASING PROSPERITY

INDIANAPOLIS, Aug. 30—Messrs. Wheeler & Schebler advise that ground has been acquired in the rear of their present buildings, and contracts let for another addition to their plant. The new building will be of brick and reinforced concrete, three stories high, and will cover an area of 235 x 125 feet. This part of the plant will be devoted entirely to the assembling of Schebler carbureters, giving employment to 800 additional men. The entire plant is still running on a 24-hour schedule, the production of carbureters having reached 900 per day, and being expected to reach 1,000 per day within the next two weeks. Contracts have already been made to supply 220,000 Schebler carbureters for the 1910 season.

## A MOST COMPLETE INSTRUCTION BOOK

To every owner of an automobile one of the most valued publications regarding the car is the instruction book issued by the factory. This is not simply because it may include hints for a novice, but because it has diagrams of the cars, and details of the construction. Especially is this true of one of the best instruction books issued this season, that of the Stevens-Duryea Company, of Chicopee Falls, Mass. The edition gives the details of the four-cylinder Stevens-Duryea cars so explicitly that one could be taken apart and assembled with no other guide. It is printed on heavy paper, and in as much style as would be given to the handsomest catalogue designed to sell machines.

Every part of the two models of Stevens-Duryea output with the four-cylinder chassis is listed, and its location indicated on photographs. The various assemblages, such as motor, transmission, rear construction, clutch, steering gear and axles are shown separately, and there are directions for the care and repair of them all. A most important part of the booklet is that dealing with the oiling systems, the various parts of the machine which need lubrication, and just how often they should be treated. Then there are detailed helps for finding any trouble or derangement, with directions as to the readjustment, being of special value in regard to the ignition and carburetion systems. By following the instructions given in the booklet there would be no need of hunting over an entire car to find the places for adjustment, for oiling and for taking up wear in the parts.

## TEST RUNS BY THE WAVERLY ELECTRIC

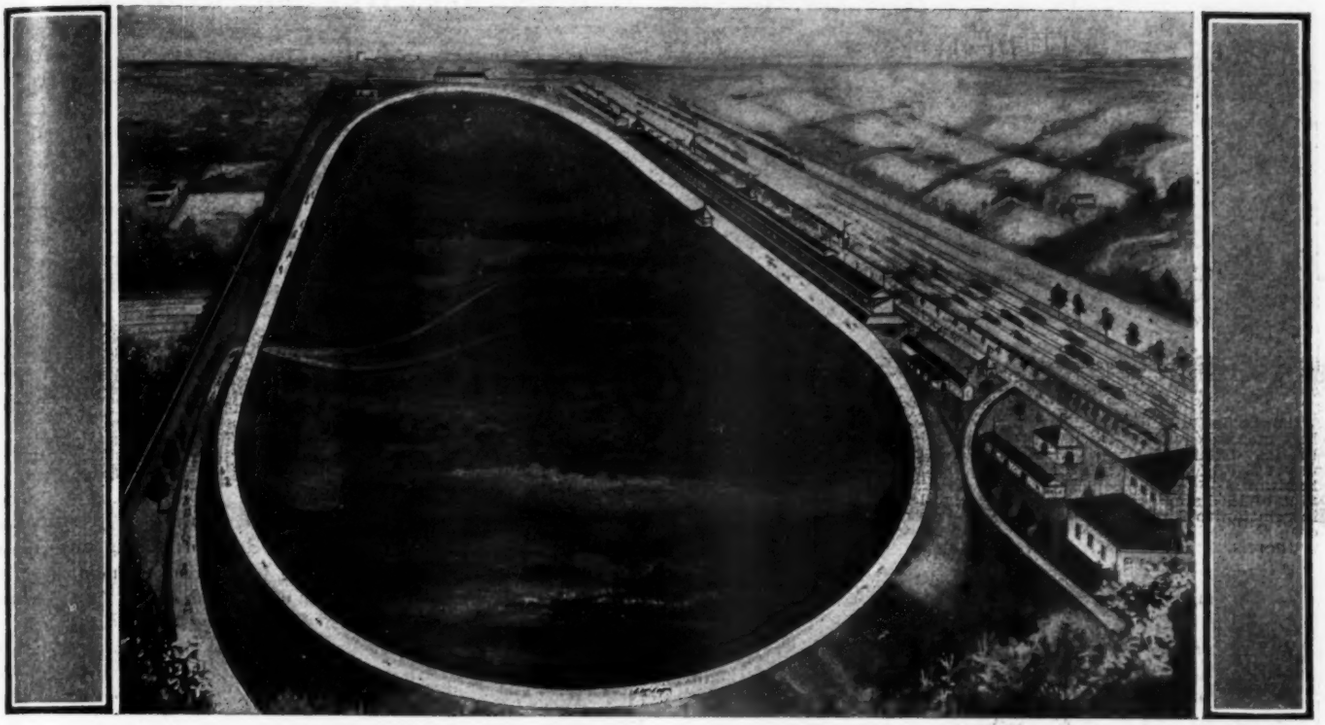
INDIANAPOLIS, Aug. 30—Some interesting experiments were recently conducted by the Waverley Company to illustrate the different mileage that may be obtained by the same car under different road and service conditions. A Waverley coupe, equipped with a 30-cell, 11-plate battery, was sent with two passengers from this city to Noblesville and return, 51 miles, over ordinary country roads with several steep hills, and was then run about Indianapolis streets until the battery was exhausted. The total mileage was found to be 65.9 miles. The same car was used for the next test, but with a 30-cell, 15-plate battery substituted. Again the coupe was sent out, with two passengers, and running on the streets, rolled up a mileage of 90.1, which is regarded as exceptional. In the third test the car, this time with a 32-cell, 15-plate battery, ran to Terre Haute, 76 miles, and on Terre Haute streets until a mileage of 86 was attained. Then the same car was stripped to reduce weight, the coupe top being removed; with a 30-cell, 15-plate battery, and only the driver on board, it made 142 miles without recharging.

## AMERICAN SAMPLE EXHIBIT AT BERLIN

Automobile and accessory manufacturers may be interested to know that arrangements have been perfected for opening a permanent sample exhibition in Berlin in the spring of 1910. The enterprise is in charge of the American Exhibition Company, 77 Broad street, New York, from whom blank applications for space and any desired information may be obtained. The aim of the exhibit is to demonstrate to European, and especially German, merchants and business houses the importance and excellence of American manufacturers, and to this end the German management will advertise the exhibition throughout the Continent, and will co-operate with American manufacturers and exporters in every way.

## MOVING PICTURE SHOW "EN AUTO"

COLUMBUS, O., Aug. 30—Albert Taylor, of Mt. Sterling, O., has devised a new use for the automobile, for since the wonderful growth of the moving picture business he has been carrying his entire outfit on an automobile truck. A machine with a capacity of three tons is used, and on this is loaded a tent and all the paraphernalia necessary.



How the Big New Atlanta Autodrome Will Look When Completed Ready for the November Races

## AUTODROME WILL HAVE A $5,000 TROPHY

ATLANTA, GA., Aug. 30—The city of Atlanta is going to be asked to stand sponsor for the big $5,000 trophy that is to go to the winner of the star event of the races at the Autodrome in November. What is more, the people of Atlanta are going to be asked to take part in the presentation. This is all to be done at the request of the Atlanta Automobile Association. Not because the association wants any part of the expense borne by the people, but because it is believed that the citizens generally wish to take part in the donation.

It has been determined to give a $5,000 trophy to the driver coming in first in the big race, and on that trophy will most likely rest the seal of the city of Atlanta. It will be the gift of the city, and all the people will have an interest in the giving.

Mayor R. F. Maddox has named a committee to look after the trophy funds and to take charge of the matter for the city. The general council is expected to vote its approval of the gift.

## CHEYENNE'S MOTORDROME A SUCCESS

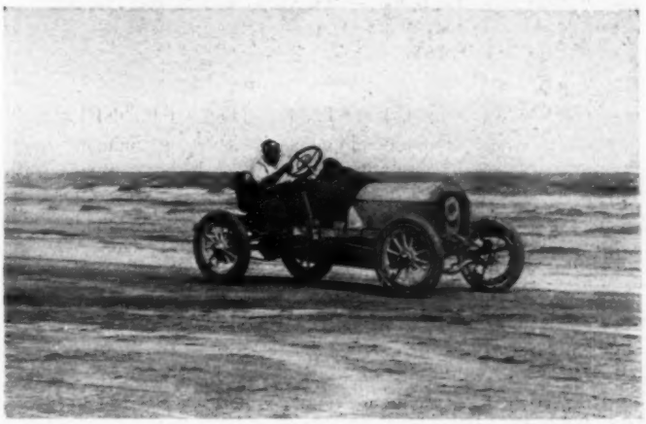
CHEYENNE, WYO., Aug. 27—The much-talked-of motordrome, built under the direction of the Cheyenne Motor Club, is considered to be a great success, and it will be much improved during the next few weeks. The great gathering in this city for the races, which were held here on August 17, has led local capitalists, as well as the members of the club, to enthuse over the prospects of making this the center for racing in the West. The Denver Motor Club was represented by a delegation of 200, who toured to this city in about 60 machines.

The two feature races last week were the one at 200 miles and the one at 25 miles, both well entered by a fast field. The long-distance event was captured by Martin Fletcher in a 40-horsepower Oldsmobile in 3:39:47, an average speed of about 58 miles per hour. The Marmon, driven by Harry Ball, was second, and the Renault, driven by Charles Basle was third. The other starters were: Moon, Harold Brinker; Colburn 30, Al Ingersoll; Colburn 40, Ernest Griffith; Buick, Gaston Morris. Basle, in the Renault, captured the 25-mile race, in 25:17, with the Oldsmobile second, in 25:59, and Ingersoll's Colburn third, in 27:36. Fletcher, in the Oldsmobile, was given official credit for the fastest four-mile lap, 3:40, or 65.4 miles per hour.

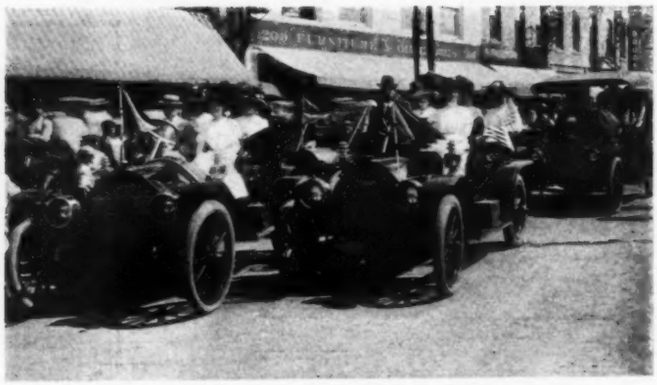
## TEXANS RACE ON GALVESTON BEACH

GALVESTON, TEX., Aug. 28—A crowd of fifteen thousand people saw some fast racing on Denver Beach, near this city, last week. The five-mile course along the beach had been rolled hard and smooth by the waves, and many of the cars reached mile-a-minute speed. The popularity of the races came near proving their undoing, as the three policemen assigned were worse than useless to keep the course clear. After the first lap had been run the spectators swarmed out on the beach, and only opened a narrow passage as the speeding racers bore down on them.

The first event, a 50-mile free-for-all, was won by Belcher with a 50-horsepower Knox in 51:54 1-2, closely pursued by the 30-60 Stearns, driven by Kent. Captain J. W. Munn, who had entered a special car of his own construction, stripped a gear at the start. It is probable that even better time could have been made with a clear course. The motorcycles provided the fastest time, Hogans on an Indian covering 10 miles in 9:05 1-2. The last two races were run over a three-mile course. Dehyma, a young driver from San Antonio, won the second event with his Stoddard-Dayton in 22:05 1-2 for the 21 miles, in spite of the seven sharp turns. In the final, at nine miles, Dr. Gammon's E.M.F. beat a Buick in 11:40.



Knox, Which Won 50-Mile Free-for-All, Speeding on the Beach

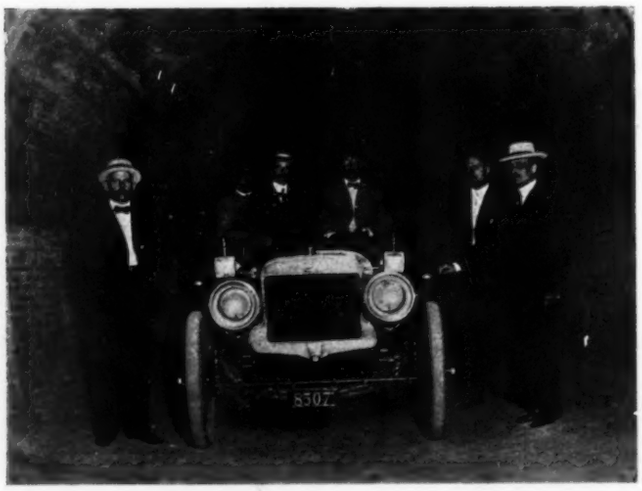


**Privately Owned Moon Cars in St. Louis Demonstration**

"Made in St. Louis" was recently celebrated in that city. The line-up of Moon cars, two abreast, extended over two whole city blocks. This very large parade of locally made cars attracted an unusual amount of attention from the usually staid and quiet inhabitants of the Missouri city. This city has, however, despite the fact of its being staid and quiet, a very large number of machines in relation to its population, and what is more, the owners drive the cars themselves. The cars in the parade were mostly of the "45" type, since the new thirty is not yet being sent out for public use.

**First Car from the Rider-Lewis Anderson Factory**

Just 14 days after the installation of the new factory of the Rider-Lewis Motor Car Company, at Anderson, Ind., the first 1910 car was turned out. The capacity of the plant will be from 20 to 30 cars per day, and will soon be in full running order. The officers and employees of this hustling western company think that this is "going some" even for a hustling town. It is said that this same speed will be applied to the further production of the models for the ensuing year, which will be pleasing news to the many agents, who have already contracted for the factory output.



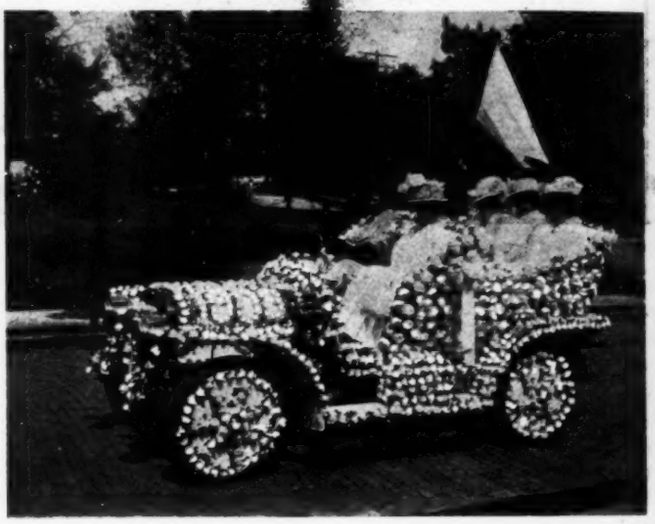
**Seventy Feet Under Baltimore in a Winton Six Touring Car**

W. L. Duck, manager of the Baltimore branch of the Winton Motor Carriage Company, recently took a party of friends for a ride in the new $1,500,000 sewer being constructed in that city. The tube is 5 3-4 miles long, its deepest section is 70 feet below the surface, the height 11 feet, and the width 12 1-4 feet.

## MOON CARS ENTER THE $1,500 CLASS

St. Louis, Aug. 30—The popular $1,500 class has received another addition in the 1910 Moon "30," which the Moon Motor Car Company of this city will bring out as a running mate to its "45." The Moon engineers have been at work on the design of this car for the last two years, so that its production is undertaken with full preparation and forethought. In its general lines the "30" follows the usual Moon practice; many parts of the two models are interchangeable. The new car has not been skimped in any way to bring down the price. Its pressed steel frame is of a section 4 inches deep; it has 34-inch road wheels and a 1 3-4-inch crankshaft. A magneto is regular equipment. The change-gear gives three speeds, selectively operated, and is carried on the rear axle. About one thousand of these cars will be built during the coming y[illegible].

The Moon "45" for 1910 wi[illegible] be a continuation of the present model, with a few changes. T[illegible] cylinder dimensions will henceforth be 4 3-4 x 5 inches; the [illegible]heelbase has been lengthened to 120 inches, and 36-inch wheels [illegible]ill be used.



**Winton Prize Winner in Floral Parade**

This car, owned and driven by Charles E. Bradfield, of Barnesville, O., won first prize in a floral parade held in that city recently. White roses were used chiefly in the decorations.

## THE PIERCE WINNER'S TAIL LIGHT

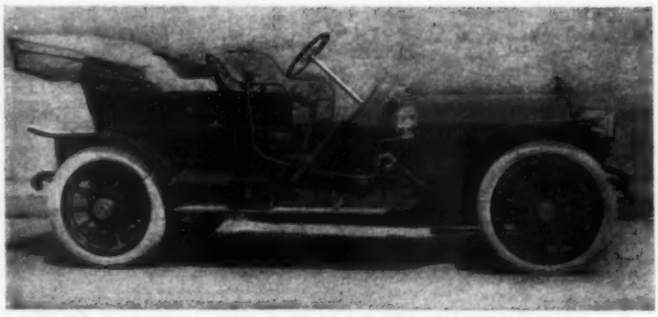
New York, Aug. 30—In the showrooms of the Harrolds Motor Car Company, the New York agent for the Pierce-Arrow cars, is No. 108 Pierce roadster, which won the Hower trophy in the recent A. A. A. tour. There has been considerable contention since the finish of the contest as to the condition of the tail lamp of this car, and the Harrolds' officials are showing it to prove their claim that there has been a misunderstanding in the matter. It has been stated recently that this lamp was bent, that its bracket was in a similar condition, and that it is impossible to light it.

That this is a mistake, however, is shown by inspection of the protested part. The lamp and bracket are still covered with Kansas mud, and evidently no attempt has been made to repair it—if that had been necessary. The bracket is straight, as a comparison with those of touring cars on the show room floor shows. The lower half of the lamp—the part below the side lug—was evidently struck by something and bent slightly to the rear, but not loosened. The upper half of the lamp is as straight as it should be. The glass in the door was broken during the trip, but that the lamp would burn was proven by John S. Williams, who drove it in the tour, by the application of a match.

In regard to the statement that the Pierce-Arrow did not have to light its lamps all around in being tested, a Harrolds Company representative asks as to whether those cars which did light lamps were given their inspection at night. The lamps would thus be required by city regulations.

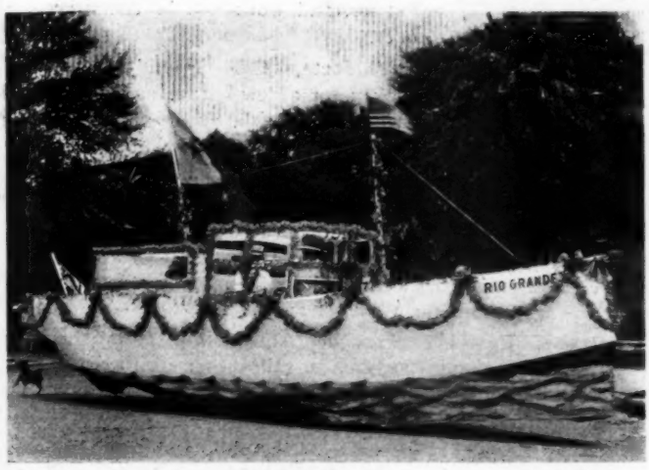
## SUPERINTENDED BUILDING HER OWN CAR

When it came to building the car for Mrs. John G. Agar, of New Rochelle, N. Y., nothing else would do but that Mrs. Agar superintend the construction of the car, and, in particular, the body and trimming, herself. This was upon the occasion of the purchase of her annual car for the year 1909; that is, she has had so many Columbia cars, both gasoline and electric, that to the factory it seems as if she buys one every year. This latest acquisition is a distinctive car, in that it is one of the 50-horsepower Columbias, but three of these having been built by the Electric Vehicle Company, now the Columbia Motor Car Company. These three were powered with four-cylinder 5½ by 5½ engines, characterized by the usual make and break ignition and a number of new features not previously incorporated in Columbia cars. So well have these three cars done that the management is thinking seriously of adding this to the 1910 line as a high-powered leader. The Agar car, as shown above, was equipped with a five-passenger, close-coupled body, painted a dark blue with a stripe of lighter blue.



**One of the Three 50-Horsepower Columbia Touring Cars**

An unusual interest attaches to this car, for all of the final work upon it was superintended by a woman. It matters not that the chassis was all finished ready for the body when she took up her work, she should get the credit which belongs to her. The color scheme is an unusually beautiful one, also Mrs. Agar's idea, a very dark royal blue with a very fine hair line stripe of a lighter tint of blue. To the chassis, as well some interest attaches, since that, too, is out of the ordinary, being one of the only three fifty-horsepower Columbias ever built, these three being a special trial lot.




**Decorated Premier Wins First Prize in Tampa Celebration**

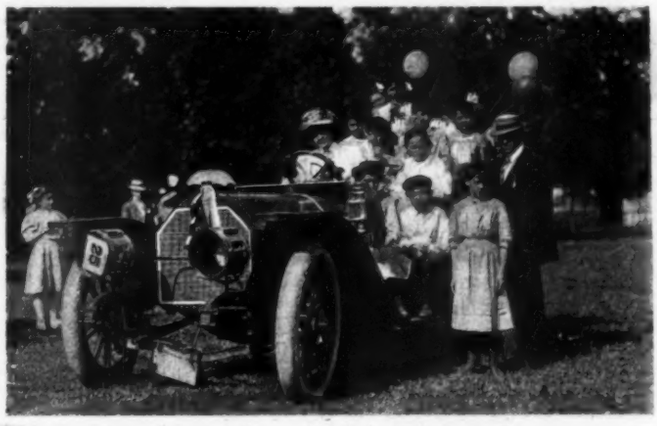
## TAMPA TO HAVE AN AUTO RACE TRACK

TAMPA, FLA., Aug. 28—Among the several important instances incident to the phenomenal progress made by this city during the past eighteen months was the celebration of the Fourth of July. This took the form of a thanksgiving celebration in honor of the establishment of a regular weekly schedule by the Mallory Steamship Line between Tampa and New York City. The feature of this celebration was the automobile parade, in which over three hundred cars participated, all handsomely decorated. The procession made a tour of the city covering a little better than fifty miles of excellently brick-paved streets. The first prize was awarded to T. Edward Bryan, president of the Tampa Auto Club, and vice-president of the Tampa Board of Trade, who had his Premier "30" converted into an exact reproduction of the Mallory steamship *Rio Grande*, which was the first steamer to enter Tampa under the new schedule.

Within the past few days the Tampa Auto Club has purchased a tract of 7,000 acres of land near the city, upon which it proposes to construct at once a five-mile auto race track.

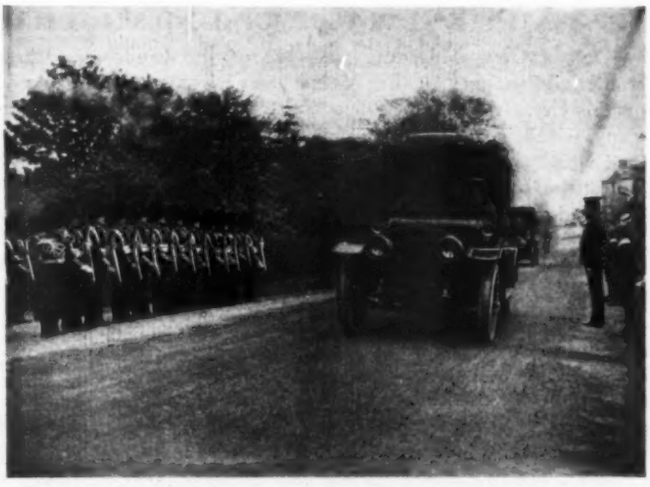
## MAXIM VISITS OLD HOME IN A FRANKLIN

As illustrating the great strides made in invention in the later days is a trip made recently by Hudson Maxim, of gunnery fame, to his old home near Abbott, Maine. Forty years ago Mr. Maxim left his boyhood surroundings and made his way, as best he could over the rough paths, to the nearest town, and later to the big cities. His return, however, was under more auspicious circumstances, for he drove his six-cylinder Franklin touring car over Maine highways in as many hours as it had formerly taken days. In speaking of the trip, Mr. Maxim said: "The big Franklin took us from Indian Rest to Guilford in five hours' time."



**Mrs. Kenneth R. Otis Gives Orphans an Outing**

An impression that Mrs. K. R. Otis of Cleveland cares for nothing but breaking road records with her Stearns car is disproven by this photograph. It was taken during the recent Orphans' Day celebration in Cleveland, and shows Mrs. Otis seated in her car, surrounded by the orphan children whom she elected to show a good time on that particular day. Not only was the good time forthcoming, but Mrs. Otis, in the little ways peculiar to her sex, made the children riding in her car feel that they had an especially delightful day, more so than other children, who were so unfortunate as to be driven out for the day in cars handled by mere men. As usual, the car behaved perfectly, never once giving the skillful driver a chance to show how well she is acquainted with its mechanism nor an opportunity to display her skill in making impromptu roadside repairs. Mrs. Otis said that she enjoyed the day fully as much as any of the little charges in her care.



**Rushmore Lamps to Light the British King**

This photograph shows the new English Daimler car with a Silent Knight engine which has just been purchased by King Edward VII of England. The car is equipped with Rushmore headlights, and is the second at the royal garage thus furnished. The picture was taken at the Goodwood races and the King is in the car.


"The Man in the Moon" Is Henry Merrill

At the wheel of his Moon demonstrator, he is leaving the handsome garage of the Kansas City Moon Car Company, the Moon representative in Western Missouri, of which he is president.

HENRY, ILL., Aug. 30—The Henry Auto Company has recently completed one of the best equipped garages in this part of the State. It is a two-story brick building, with the basement acting really as the first floor. The main floor has its entrance direct from the street and is used by the salesroom, offices and garage departments. The lower floor is reached by an incline road on the exterior of the building, for automobiles, and is given over to the repair shop. The dimensions of the structure are 50 by 70, allowing ample space for the work of the concern. Inasmuch as it is situated upon the river bank, a considerable trade in motorboat supplies and repairing is carried on. A private heat and power plant is maintained, using electricity for power direct from the plant during the day, and from storage batteries at night, or when the dynamo is not being run. The shop is equipped with lathes, drill press, forge, emery grinder, air compressor and tank, and a full line of small and portable tools. The agency for the Ford, Rambler and Holsman automobiles is held, as well as for Ferro marine engines and Yale motorcycles.

## UP-TO-DATE GARAGE—UP-TO-DATE CITY

KANSAS CITY, MO., Aug. 16—One of the handsomest show rooms and garages in the West is located at 3320 Main street, in this city. It is the local headquarters of the Moon Car Company, which is the exclusive agent for the Moon in Kansas City and vicinity. Henry Merrill, the president of the company, is the oldest dealer in Kansas City, and is the man at the wheel of the Moon demonstrator shown in the above photograph, which is just leaving the entrance of the garage. The company has had a very successful season and is making active preparations for the business of 1910.

**Baltimore**—A magnificent show room is being built by J. A. Rice, manager of Rice's Garage, Madison and North avenues. To make this improvement, 2,400 square feet of floor space which was formerly devoted to storage purposes, is being used. Manager Rice recently made an extended trip to the Welch factory in his six-cylinder Welch, covering almost 3,200 miles in the run.

**Philadelphia**—The Franklin Motor Car Company has given a contract for the construction of a machine shop and garage at 3430 Chestnut street. This will be made the headquarters and the present location at 143 North Broad street will be retained for show purposes.

**Los Angeles, Cal.**—Edward Gadden has had plans completed for the erection of a brick garage on Hope street, between Eleventh and Twelfth streets. It will be 50 by 157 feet in size, with cement floors, plate-glass front, reception and show rooms, shops, etc.

**Jacksonville, Fla.**—Frederick Philips has opened a new garage at the foot of Laura street, which is one of the best equipped in the State. He will hold the agencies of the Franklin, Chalmers-Detroit and Hudson. J. T. Mollard will be in charge.

**New Haven, Conn.**—The Wheeler & Wuesterfeldt Company has filed plans for the erection of a garage and automobile repair shop, to be built at Temple and George streets. It will cost about $21,000, and work will be commenced at once.

**Valdosta, Ga.**—Ground has been broken for a new garage and repair shop for A. A. Parish, at 116 and 118 West Central avenue. The buiding will be 60 by 90 feet in size and fully equipped with apparatus for storing and overhauling cars

**St. Louis**—The recently incorporated White Garage Company has leased the eastern half of the modern garage at 5023-25 Delmar Boulevard, and in addition to its garage business will have the agency for the White steamer.

**Latrobe, Pa.**—The Latrobe Automobile Company has opened a garage at Latrobe, 30 miles east of Pittsburg, on the main line of the Pennsylvania Railroad, and will have two good agencies.

**Tampa, Fla.**—The Southern Automobile Company has purchased the garage in the rear of the Almeria Hotel, and will conduct a general garage, repair and agency business.

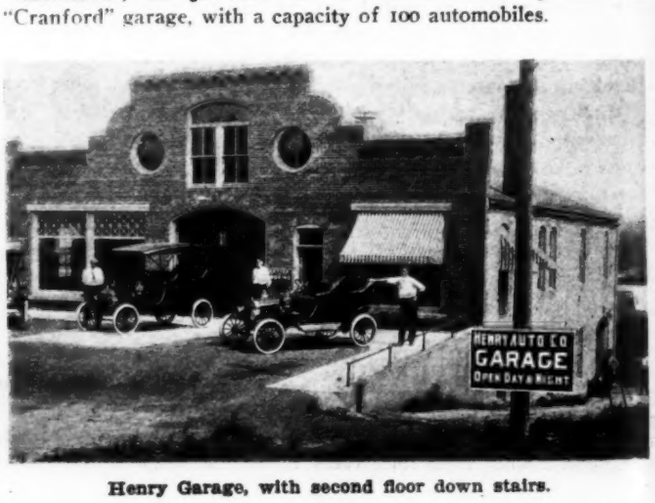
**Anderson, S. C.**—J. S. Fowler has completed his new garage on West Benson street, and has opened it to the public. It is under the direction of J. C. Stribling.

**Houston, Tex.**—Lea, McKallip & Abbey have opened a new garage and salesroom at 714 Main street, and are acting as agents for the Jackson and Babcock cars.

**Bolivar, N. Y.**—A garage which will accommodate 30 machines will be built for Michael Healy on Belmont street. It will be 40 by 80 feet in size.

**McPherson, Kan.**—The McPherson Garage Company has occupied its new building on Main street. The building is of brick, one story, 50x120 feet.

**Elizabeth, N. J.**—Newton A. Barnett has opened the "Cranford" garage, with a capacity of 100 automobiles.




Henry Garage, with second floor down stairs.


**A Squad of Ramblers Soon to Be Delivered Into Their Buyers' Hands**

These cars were recently delivered to W. A. Nolan, of Grand Meadow, Minn., the Rambler agent for the vicinity, to be distributed among the prosperous Minnesotan wheat-growers. Automobiles are found on every farm in this part of the country.

**Marmon Will Not Build Racing Cars**—The Marmon car made its début in track racing at the Indianapolis meet, but the manufacturers state that they have never built racing cars, and have no intention of doing so. Three of the stock cars were put in the speedway events because the Marmon interests felt they should assist the home enterprise. The results, however, were exceedingly gratifying and cause for congratulation, because the machines again proved reliability, which has been shown many times on the road. One of the Marmons captured the 10-mile free-for-all, and another was third in the 15-mile handicap; but it was in the long-distance events that their best showing was made. In the 100-mile race there were two "Thirty-twos," and they took third and fourth places, making the century in 1:42:30—very nearly a mile a minute. In the 300-mile contest on the last day all three Marmons were running beautifully when the race was called off at the 225-mile distance. Only seven of the 19 entries were then left in the grind, three of them Marmons, and it appeared that they were sure of leading positions.

**Additions to the Quaker City Auto Row**—Before snow flies there will be at least two fine additions to Philadelphia's automobile district, one the building of the Dayton Motor Car Company at 253-259 North Broad street, and the other the new Horn & Hardart building at 242-248, just across the street. The Dayton Company's structure will be three stories high, 85 by 120 feet in dimensions, and thoroughly equipped from basement to roof with facilities for sales business, garage, repair shop, and patrons' and chauffeurs' club rooms. The main part of the Horn & Hardart edifice will be occupied by the local branch of the Winton Motor Carriage Company. It too will be three stories high, and its size will be 75 by 180 feet, of reinforced concrete. A recent addition to the row was the local branch of the Continental Caoutchouc Company, at 154 North Broad street, with S. S. Poor as manager.

**Grout Showed Well in Hill Climb**—At the recent hill climb of the Chicago Motor Club at Algonquin the 32.4-horsepower Grout was one of the class winners. The time of the cars in the formula class was taken in connection with the weight of the car and driver, with the piston displacement, and the result was a handy win for this car. Its percentage for its work upon the two hills combined was 8.03, with a leeway of 0.41 points between it and the second car, one of 8 more horsepower. Not only did it win through the combined formula, but the record on each hill was better than its competitors. In the plain time events it ran in a class with cars of greater power, finishing third.

**New Buildings at Thomas Factory**—Extensive building operations are now going on at the plant of the E. R. Thomas Motor Company in Buffalo. Factory No. 1 is being enlarged by the erection of a structure of saw-toothed type, 200 feet long, and plans are being made for building a separate factory, 280 feet long, 100 wide, and three floors high, in which to manufacture taxicabs. The latter will be erected only in case the concern is unable to secure for the work a suitable plant already built. Recently the officers of the company were treated to a trip down the river on a steamer and a clambake at Edgewater.

**Rain Increases Texas Automobile Sales**—A soaking rain during the latter part of the first week in August so increased the sales of automobiles in Dallas, Texas, that increased sales forces were made necessary. The assurance of heavy crops was brought by the water, and farmers immediately bought on futures. It has been stated on good foundation that 50 sales resulted from this reason alone. In spite of the great production planned by the factories, the dealers complain that they cannot secure deliveries fast enough.

**Hoyt Electrical Company Expands**—The Hoyt Electrical Instrument Works at Penacook, N. H., has purchased a piece of land on Main street with a frontage of 100 feet, on which to build a modern fireproof garage and salesroom. The increased business in electrical instruments has necessitated the entire use of the factory in this line. The new garage will be on a street which is part of the central trunk boulevard being built through to the White Mountains.

**Grout Wins Two Prizes in Run**—In the recent sociability run between Schenectady, N. Y., and Bennington, Vt., Mrs. C. T. A. Howe, of the former place, driving a powerful Grout touring car, won the prize for women drivers as well as the second prize in the competition. In the latter case her time was three hours and 46 minutes, and that scheduled was three hours and 51 minutes.

**"Red Head" Now Copyrighted**—The unique trade-mark adopted by the Emil Grossman Company, of New York, for its spark plugs has been copyrighted in the United States Patent Office, both the name and the design of the boy mascot, with his impish grin, being thus protected. The Emil Grossman Company says that 106 jobbers in this country are now handling the plug.

**Columbus, O.**—The Love Garage Company has recently been incorporated with a capital of $5,000 to operate a general garage business on West Fifth avenue. The incorporators are: Fred E. Love, James P. Love, R. E. Love, W. H. Furgeson, and H. J. Powell. The new concern takes over the business formerly conducted as a partnership by several of the incorporators.

**New York to El Paso in an Auto**—An interesting journey overland was started in New York last week, when C. A. Root left in his Packard car for El Paso, Tex. He stated that he hoped to travel 250 miles every day, if possible. The car is equipped with Continental tires, selected, according to Mr. Root, "because of their long wearing qualities."

**Testing First 1910 Velie**—H. G. Moore, secretary and sales agent of the Velie Motor Vehicle Company, Moline, Ill., is making a long trip to test the first of the 1910 product. Last week he reached Columbus, O., and ran to Cincinnati. The car is standing the hard run in fine shape, showing up well in tests of climbing and speed.

**Great Western "in the Swim"**—The Kansas City (Mo.) branch of the Model Automobile Company has evolved a picture postal showing a man fishing from the tonneau of a Great Western car, which is standing up to the hubs in a rushing stream. It is quite a clever bit of advertising, and should bring many inquiries to the hustling agent.

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### IN AND ABOUT THE AGENCIES

**Selden, Philadelphia**—The Selden car is the latest comer to Philadelphia's automobile row, having just been installed in handsomely fitted quarters at 336-338 North Broad street. The Selden Car Company of Pennsylvania, which is the official title of the new enterprise, has for its president L. S. Caswell, who has been identified with the Selden patent since 1897 and has occupied the position of sales manager at the Rochester factory. W. B. Alley is vice-president, and Fred. E. Dyer, treasurer.

**Winton, Philadelphia**—The Philadelphia branch of the Winton Motor Carriage Company will soon have a new home twice the size of its present headquarters. The building now occupied at 246-248 North Broad street is to be torn down and replaced by a more modern structure. Temporarily, Manager A. E. Maltby and his force will seek other quarters, but they will return when the new building is completed. It is expected to be ready for occupancy on January 1.

**Morgan & Wright, Atlanta, Ga.**—Morgan & Wright announce a change in the location of the Atlanta branch, having just taken possession of the premises at 50 North Pryor street. Herbert Starnes has succeeded the Alexander-Seewald Company as manager. Mr. Starnes is one of the oldest employees in the M. & W. service, and has acted as its southern representative in the States of Kentucky, Tennessee, Mississippi, and Alabama for several years.

**Columbus Concern Enlarges**—The Central Ohio Motor Car Company, which has the Columbus agency for the Velie and Hupmobile, has equipped a top and machine shop at its headquarters, 61 East Spring street. The plant is already in operation. C. Roy Clough is general manager.

**Franklin, San Francisco**—The new San Francisco branch of the Franklin Automobile Company has secured temporary quarters at 404-406 Golden Gate avenue, which it will occupy until January 1.

### PERSONAL TRADE MENTION

**Arthur T. Stewart**, of Philadelphia, manager of the automobile wearing apparel department of MacDonald & Campbell, will sail this week for Europe. This is Mr. Stewart's annual trip to secure the newest styles from the foreign capitals. To bid him farewell, a dinner was tendered last Thursday evening in the Quaker City. Prominent automobilists and newspaper men were present at Turf Villa, on the banks of the Schuylkill, to give him a rousing send-off.

**Paul L. Snutsel**, foreign representative of C. F. Splitdorf, sailed on last Saturday for an extended trip to London, Paris, Turin, Barcelona, and Brussels. In each of these cities Splitdorf branches have been established to better care for a constantly increasing European trade in this company's magnetos and electrical specialties.

**George T. Gould**, who has been connected with the Rainier selling force in New York for the past year, has been appointed New England agent for the Rainier cars, with headquarters in Boston. He has already entered the field in that city, and has obtained show rooms and garage space on Boylston street.

**H. N. Dunbar** has been appointed manager of sales of the Mutual Motor Car Company, of Pittsburg, the agent in that city for Stearns cars. For the past year Mr. Dunbar has been in charge of the sales of the Gabriel Horn Manufacturing Company of Cleveland.

**Harold A. Buzby**, secretary and sales manager of the Keystone Lubricating Company, manufacturers of Keystone grease, is making a tour of the company's Western branches at Chicago, Denver and San Francisco. He will return about September 1.

**Robert G. Pilkington**, for 10 years a specialist in the design of commercial gasoline automobiles, has been placed in charge of that class of work for the Studebaker Company in Detroit.

**Henry Goodman**, who for the past five years has represented the Waverley Company in New England and New York State, has tendered his resignation, with future plans as yet undecided.

### SWINEHART COMPANY ELECTION

AKRON, O., Aug. 30—At a meeting of the stockholders of the Swinehart Clincher Tire & Rubber Company, the following officers were elected: President, J. A. Swinehart; vice-president and general manager, W. W. Wuchter; secretary, C. O. Baughman; treasurer, R. A. May. Mr. Swinehart will sail about October 1 for Europe to attend to the interests of the concern across the Atlantic, and in his absence, the active management will be in the hands of Mr. Wuchter. The latter for the past five years has been the general superintendent of the Firestone Tire & Rubber Company, and will now give his experience to the interests of the Swinehart Company. It is the intention to eventually embark in the manufacture of a pneumatic tire which is now being developed.

### MODEL COMPANY NOW GREAT WESTERN

Peru, Ind., Aug. 30—A name which has been very familiar in this city during recent years will go out of existence on Wednesday. It is that of the Model Automobile Company, which will be changed to the Great Western Automobile Company, but with no alteration in the ownership or management. The new name, according to factory officials, indicates that the concern will continue its business along broader planes.

### CHANGES IN THOMAS BRANCHES

Buffalo, N. Y., Aug. 30—The E. R. Thomas Motor Company, manufacturer of Thomas Flyers, has established a branch in Chicago, temporarily located at 1325 Michigan avenue until the new Thomas building is opened further up the Row. Cal T. Paxson, who has had charge of the Thomas retail department in this city, has been appointed manager of the new house, and has taken as his assistant Gaylord Warner of Kansas City.

Cal T. Paxson

Arthur W. Haile

Arthur W. Haile, formerly Mr. Paxson's assistant in the local sales work, has succeeded him as manager. Mr. Haile has had three years' experience in this line in Buffalo. The new branch in the Windy City is the third Thomas direct representation opened, the others being in New York and Boston.

### CHANGES IN CONTINENTAL PERSONNEL

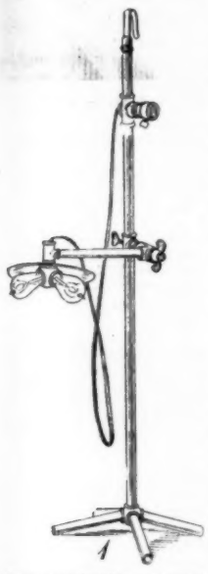
With the opening of several new branches and the appointment of sales manager well known in the trade, J. M. Gilbert, manager of the Continental Caoutchouc Company, has materially strengthened his selling organization. O. S. Tweedy, formerly manager of the Chicago branch of the Diamond Rubber Company, and recently connected with the Federal Rubber Company, has been appointed sales manager, with home offices at 1788-90 Broadway, New York. E. E. McMasters has been made the sales manager for the West, and J. H. Sheldon a similar position in the East. The new branches are located in Boston and Philadelphia, the first under the management of E. E. Kidder, located at 895 Boylston street. The Quaker City house is located at 154 North Broad street, under the direction of S. S. Poor.

**A Prominent Car and Its Equally Prominent Producers and Sellers**

Officers of the Chalmers-Detroit Motor Company and its latest product—the Chalmers-Detroit "Forty" for 1910. In the front seat at the wheel is H. E. Coffin, vice-president and designer, and beside him is Hugh Chalmers. In the tonneau are Messrs. Bezner, Brady, and Counselman; also Carl H. Page, the New York City dealer

# Information for Auto Users

**Aladen Portable Light Stand**—Owners and chauffeurs who have ever tried to make adjustments by the light of a ceiling lamp, or who have had their hand lamps, after being carefully draped over the dashboard, suddenly fall on the cylinder head and suffer a smashed bulb, will appreciate this portable light stand brought out by the I. J. Smith Mfg. Co., 4283 Park avenue, New York City. The light itself consists of a cluster of four bulbs, backed by a reflector, and furnished with 15 feet of cable and an attachment plug to go in an ordinary electric lamp socket. The cluster is carried on a doubly jointed arm, similar to those often used in draughting rooms, so that it may be adjusted to throw its light in any direction. The arm in turn is carried by a 6-foot stand of steel tubing, with a broad base, and may be slid up and down and clamped at any desired height. The top of the stand is provided with a hook, by means of which it may be hung from the ceiling. Thus a steady and powerful light may be thrown on any part of the mechanism of the car from any desired direction. The cluster of lights may also be detached from the stand for use as a hand lamp.



ONE POSITION OF THE STAND.

The wire which connects the stand with the plug is held clear of the floor, so that it will not trip up any one working around the machine and will not be worn out. As a convenience this little stand is far more valuable than its size and cost would indicate.

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**Veeder "Odo" Has New Gear**—The new model of the Veeder odometer, known as Form B, is equipped with a spiral driving gear, for which the Veeder Mfg. Co., of Hartford, Conn., claims many advantages. The gear has a much wider face than that formerly used, which gives a greater wearing surface and allows for end play; at the same time this makes close endwise adjustment unnecessary. Nevertheless, the gear has all the advantages of the old narrow gear, as it cuts easily through mud and dirt, and the spiral teeth eject any obstructions that may come between them. The gear is made of steel, with cut teeth, and despite the hardest kind of usage will last almost indefinitely. The bearings, too, are improved, and are much heavier than those of the 1909 model. The new gear is especially adapted for service on trucks and other heavy vehicles. The body of the odometer remains unchanged. The Veeder Mfg. Co. is now supplying the trade with this type of instrument at the same list price as last year"s type of Form B.

In this respect the Veeder company is following its usual policy of constant improvement.

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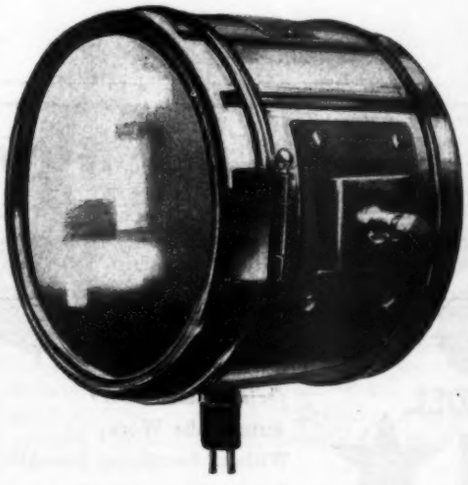
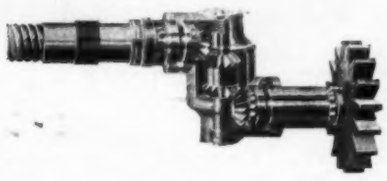
**"Guide" Electric Auto Lamps**—Another believer in the future of electric automobile lighting is the Guide Motor Mfg. Co., of Cleveland. This company makes an extensive line of electric lamps and searchlights for automobile use, and also for motor boats. One of the special features found in "Guide" lamps is the dust-proof front, which prevents obscuring or tarnishing of the reflector. Tungsten bulbs are used in all lamps. To give some idea of the numerous styles in which these lights are made, it may be said that the "Guide" line includes three different types of headlights, three of side lamps, one of which is illustrated herewith; two tail lamps, a meter lamp and a dome light for closed cars, all made in several sizes; besides searchlights and side lights for boats. In addition to lamps, the company handles the Elba and Kremlo storage batteries, which, unlike the usual ignition battery, are built for high discharge rates and are thus adapted to lighting use, as well as the K-W magneto.

The many advantages of electric lights are becoming more and more generally recognized. They are clean, odorless and easily operated; they are perfectly reliable, not being affected by the wind nor liable to leakage or clogging; and they are, above all, safe for use around gasoline, as they have no naked flame. The only objection to them hitherto has been their expense, and this has now been obviated by improved bulbs and batteries, and, even more, by the use of mechanical generators.



THE "GUIDE" HEADLIGHT—DUST-PROOF AND EXTREMELY NEAT.

**Stewart & Clark Swivel Joint**—One of the features of the 1910 Stewart Multipolar Speedometer, made by the Stewart & Clark Company, of Chicago, will be a ball-bearing swivel joint, which eliminates the bends in the flexible drive shaft, permitting it to be carried back along the frame of the car direct to the speedometer. The X-ray view shown herewith reveals several interesting structural details. The joint, as will be seen, consists of two pairs of bevel gears, one gear of each pair being carried on a vertical spindle. This spindle forms the main axis, about which the sleeve carrying the end of the drive shaft can swing freely. The two horizontal shafts, connected with the drive pinion and the shaft, respectively, each run on two rows of balls. The two bevels on the vertical spindle are cut from one blank, and run on a long plain bearing. The whole construction is, of course, oil and dust-proof, assuring long life to the wearing parts. The joint as a whole is patented, and will be an exclusive feature of the Stewart & Clark product.



X-RAY VIEW OF STEWART SPEEDOMETER JOINT.

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**"Aplco" Electric System**—The Apple Electric Company, of Dayton, O., has perfected an electric lighting system to be used in connection with its familiar ignition dynamo, which offers many points of interest. This machine is distinctly a dynamo, such as is used in large power stations; as its magnets are non-permanent, but excited by field coils, there is no danger of their weakening. The armature is multipolar, with 21 sections; the commutator has two combination gauze-graphite brushes set at 45 degrees from the vertical. The maximum output of the dynamo is 12 amperes. A storage battery of 30 ampere-hours' capacity, if used for ignition only, or of 60 to 100, if used for lighting as well, is connected to the dynamo through an automatic cut-out. The dynamo is provided with a governor and a load regulator, which makes possible a direct drive from a variable-speed automobile motor. The construction of the dynamo is very neat and workmanlike.

The Apple company also supplies the various accessories necessary for electric lighting, including the lamps themselves, plugs, switches and wiring. Gas and oil lamps may readily be converted to electric by means of special fittings. Preferable to this, however, is the use of lamps specially designed for electric work, and these dispense with the useless ventilators and so make a dust-tight construction.

The booklet published by the Apple company shows a number of ways of attaching the dynamo, some one of which will be found suitable for almost any car. One ingenious way is by silent chain from the hub of a gear-driven fan. The dynamo comes fitted with either a spur pinion, a sprocket or a conical leather friction pulley; any of these drives is satisfactory and any one of them may be had on order.

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